# Chemical Age

NEW RESEARCH CENTRE FOR BALFOUR GROUP

(page 877)

VOL. 83 No. 2133

28 May 1960

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY



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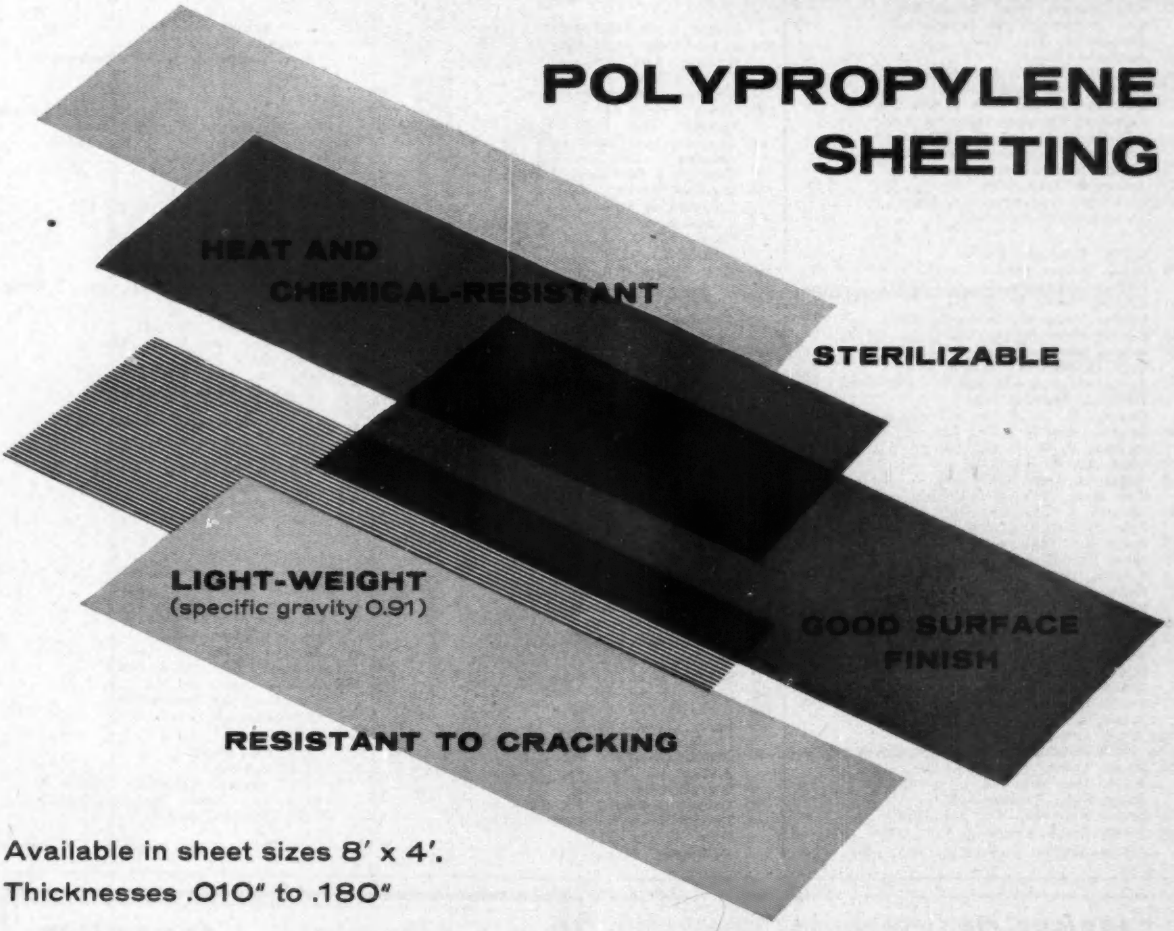


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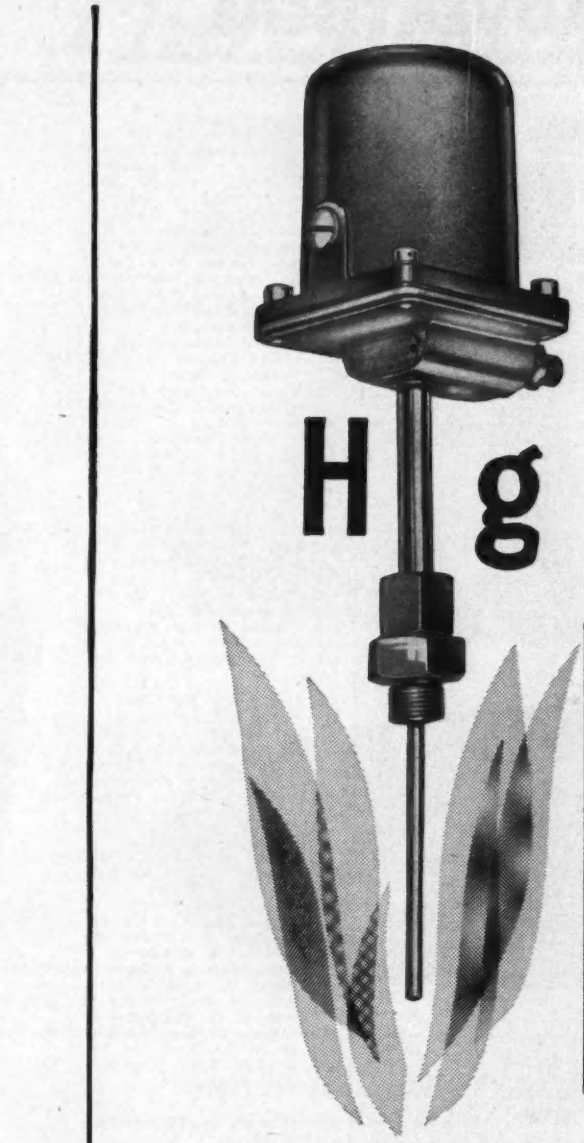


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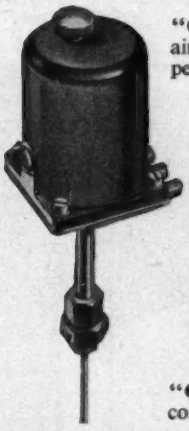

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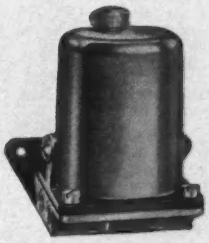

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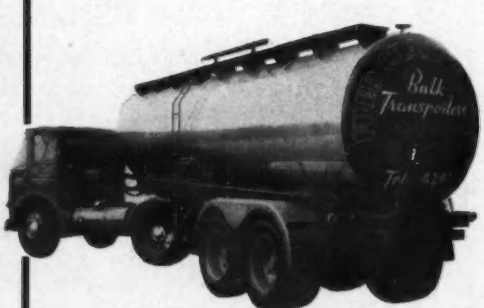

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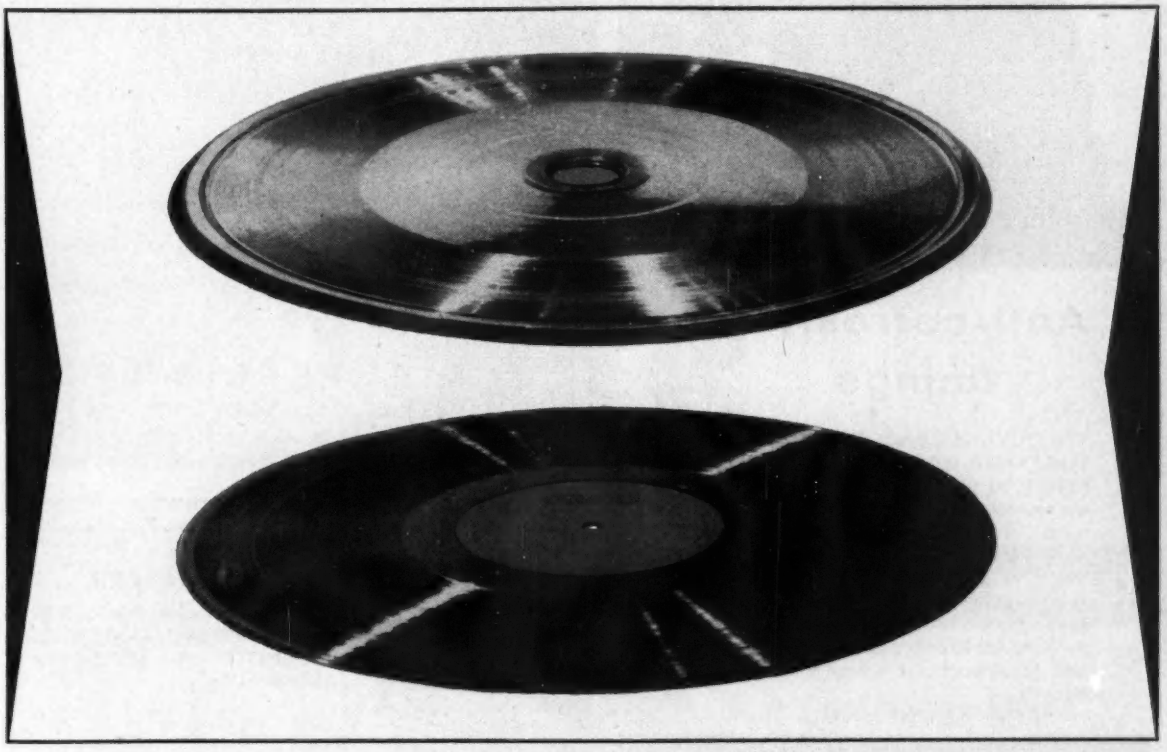

Mond Nickel Salts are used for electroforming the nickel stampers that reproduce by the hundred, high fidelity gramophone records of the most exacting quality.
Mond Nickel Salts are to be found in nearly every electroplating solution.
Other Mond Chemicals are used by the manufacturers of paint, varnish and ink, pottery, vitreous enamels, plastics and glass; by the refiners of petroleum and oil and by the farmer for animal nutrition.
Extensive technical data is available and your enquiries are invited on the compounds and elements listed here.

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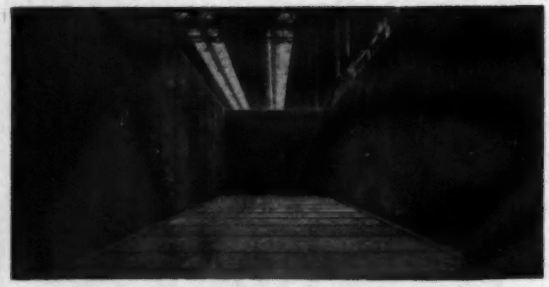

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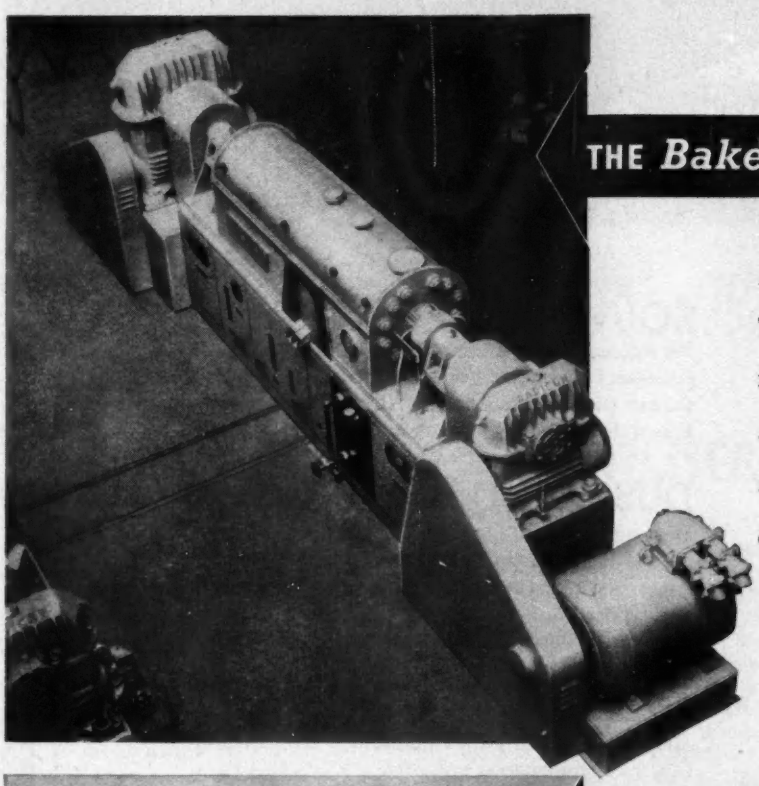

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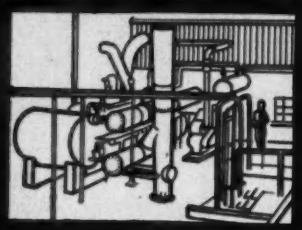

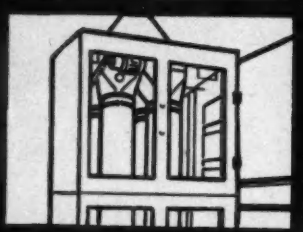

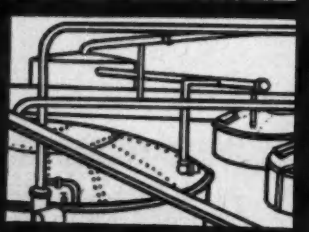

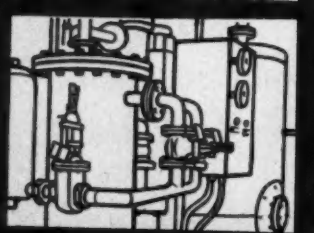

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# CHEMICAL AGE

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Editor M. C. HYDE
Manager R. C. BENNETT
Director N. B. LIVINGSTONE WALLACE

**Midland Office**
Daimler House, Paradise Street, Birmingham. [*Midland* 0784-5]

**Leeds Office**
Permanent House, The Headrow, Leeds 1. [*Leeds* 22601]

**Scottish Office**
116 Hope Street, Glasgow C2. [*Central* 3954-5]

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# FERTILISERS IN EUROPE

THE latest study from O.E.E.C. of fertiliser production, consumption and trade in member countries—'Fertilisers in Europe and U.S.A. 9th Study, 1957-60 (CHEMICAL AGE, 21 May, p. 843)—may well have more significance than its predecessors. As the new trading pattern becomes more defined in West Europe, the fertiliser tonnages that each country produces and requires must have a newer importance. Indeed, the fertiliser industries of some countries may find themselves moving into somewhat anomalous positions, with their own consumers in home agriculture left with more protection than they, as producers of essential agricultural materials, are permitted to retain.

Apart from the now familiar statistical reporting from O.E.E.C., the new study has two appendices that break fairly fresh ground—one reviews the methods by which fertiliser prices are determined in each country, the other surveys the subsidies paid by governments to encourage fertiliser use. It is timely to draw this attention to these devices of artificiality in the patterns of fertiliser trade, country by country, for these 'adjustments' of normal economics must influence, and perhaps complicate, growth of European free trade in fertilisers.

To make this observation is not to criticise the existence in some countries of official price controls and subsidies for farm fertilisers. The desirability of giving inducements to increase use of fertilisers is indisputable in most and perhaps all of West Europe. There are certainly two cogent reasons for subsidies—firstly, farming does not always enjoy a free market for its own products and it is difficult, therefore, for world prices to be fully paid for fertilisers; secondly, many farmers are still technically backward and they will not risk full investment in fertilisers unless the outlay cost is temptingly low.

In eight of the O.E.E.C. countries, that is to say, in eight of 18 European countries, fertilisers receive some kind of subsidy. Nitrogen purchases receive the most aid, 41.5% of the total subsidy cost; phosphate purchases receive 34.3%; and potash is much less aided, receiving only 8.5%. (These percentage figures do not add up to 100% because in these comments, unlike O.E.E.C., we are ignoring agricultural lime).

As for price control, only in four countries, the U.K., Sweden, Ireland and Switzerland, are the prices of all kinds of fertiliser fixed by the manufacturers or trade without any kind of Government control. In eight countries there is partial price control and in six, price control for all or most types of fertiliser is fairly complete; Belgium, Holland and Norway are among the former group, Denmark, Germany, and France are among the latter six. This very large extent to which price controls still apply to fertilisers in Europe will no doubt surprise many quite well-informed students of fertiliser science and economics. Here, price control was abandoned at the beginning of the 1950's when post-war problems of raw materials for fertiliser manufacture had been relieved and when competition between different producers could be expected to exert its own measures of control.

Actual production in Europe has continued to rise, in 1958-59 nitrogen

output rose by 8%, phosphate by 6%, potash by 3%. These increases agree closely with the percentage increases in productive capacity for the three main classes of fertiliser. But a much bigger increase in output is forecast for nitrogen, 13% by the end of 1959-60. These expansions must, of course, be considered in relation to increases in demand. In 1958-59 nitrogen consumption rose by 7% and consumptions of phosphate and potash each rose by 3%. Forecasts show further increases of 6% for nitrogen and phosphate use, 5% for potash.

Production increases are therefore slightly exceeding increases in demand, and in particular there is no sign that the very large current increase in nitrogen manufacture will be taken up by a comparably large increase in requirement. Europe has, of course, long been the world's biggest exporter of nitrogen, but this passage from the O.E.E.C. study is worth quoting: "After the very rapid expansion in exports of nitrogenous fertilisers to non-member countries between 1955-56 and 1957-58 exports fell by 8% in 1958-59." Also, U.S. production of nitrogen rose by 13% in 1958-59.

These indications for nitrogen certainly underline the warning given by Dr. Timm at the Society of Chemical Industry's overseas meeting last summer at Frankfurt (CHEMICAL AGE, 20 June, p. 1027), that "during an interim period when production capacities of fertilisers will considerably exceed the demand, the erection of additional nitrogen capacities cannot be recommended." It must also be realised that differences today of a few per cent between production and consumption are in fact very big tonnages—much bigger *per se* than similar pre-war differences in per cent terms.

Dr. Timm's own estimate of the nitrogen surplus in the world for 1958-59 was 600,000 tons (as N) or about 7% of the world's total fertiliser use of nitrogen. He estimated world capacity for nitrogen at 11.2 million tons in 1959.

One of the underlying trends in European production is that more of the increases in both nitrogen and phosphate outputs have been in the form of newer kinds of fertiliser, e.g., urea, complex fertilisers and ammonium phosphate. In proportion, increases for these have exceeded those for more traditional fertilisers like sulphate of ammonia, superphosphate, etc. Technical changes are accompanying changes in the supply and demand situation. Price controls in internal trade, subsidies, a prospectively large nitrogen surplus, and a variety of technical changes, must all complicate any attempt to assess the effect of gradual economic freedom on West Europe's individual fertiliser industries. It will be a wise man who can see the wood for the trees.

## SILICON PRODUCTION IN U.K.

SINCE silicon began to replace germanium in semiconductor devices the demand for very high purity silicon has greatly increased. Recently two firms have announced their intention of producing silicon of the required purity in the U.K. Last week the French firm Pechiney-Uclaf introduced a new subsidiary, Upsil Ltd., who will distribute silicon made by Uclaf at Stratford, London, E.15, according to the Pechiney process.

Earlier, Monsanto Chemical Ltd. had announced their plans to build a silicon plant at Ruabon, North Wales, as a result of an agreement with Siemens Company of West Germany, originators of the process Monsanto will use. These two firms are not the first in this field in this country, for I.C.I. started making silicon on a pilot plant scale in 1958 and a larger plant is nearing completion which will increase the I.C.I. manufacturing capacity to 2,000 kg. per year.

The two most useful starting materials for the manufacture of silicon are silane and trichlorosilane. Silane, produced by the action of silicon tetrachloride on lithium aluminium hydride, is carefully purified; the most troublesome impurity, boron, is converted to lithium borohydride if the lithium aluminium hydride is in excess of the added silicon tetrachloride. Silicon is produced by the thermal cracking of silane at temperatures above 500°C. The method that will be used by Uclaf is the thermal cracking of trichlorosilane with very pure hydrogen at about 950°C. In practice a mixture of silicon tetrachloride and trichlorosilane will be used. Uclaf will make their own raw materials at Stratford.

Silicon is sold in three different forms, lump, rod, or monocrystals, and in a number of grades depending on resistivity. It is used for the manufacture of a number of aluminium alloys, for the production of silicones, in the metallurgical industry, and for semi-conductor devices.

The conduction properties of silicon are dependent upon the type and quantity of impurity present. The impurities, at a concentration of a few parts per thousand million, are of either a group III element, boron, which give rise to a P- or acceptor type conductor, or a group V element, phosphorus, giving and N- or donor type conductor. The addition of impurities is known as doping.

The production of the single crystals required for semiconductor devices can be carried out by two methods, crystal pulling or zone-refining. In the crystal pulling method a seed of silicon—a small single crystal—is placed in contact with a melt of very pure lump silicon in a high-grade quartz crucible. As the seed crystal is slowly withdrawn from the crucible the molten silicon in contact with it solidifies in a single crystal form. The operation is continued until a crystal of suitable size has been grown. Crystal pulling is carried out either in an inert atmosphere, such as argon, or *in vacuo*. The purity of pulled crystals is limited by the purity of the crucible used to hold the molten silicon.

Exceptionally pure crystals can be obtained, however, by floating-zone refining of silicon rod. This method depends upon the differential solubility of the impurities in solid and liquid silicon. For most impurities, with the notable exception of boron, the ratio, solubility in solid/solubility in liquid, is very much less than unity. A rod of silicon is fixed in a vertical position and a small molten zone is induced near the bottom by a high-frequency heating coil. The coil is slowly moved up the rod and the impurities dissolved in the molten phase are drawn to the end. By repeating the process several times the whole rod can be brought to a high level of purity. If one end of the rod is seeded before refining the whole rod can be converted to a single crystal. Because boron has a segregation coefficient of 0.8 it is the most difficult impurity to remove, but this can be achieved by carrying out the operation in an atmosphere of water vapour and hydrogen, instead of argon, which converts the boron to the volatile boric oxide.

Uclaf will use the crystal pulling method to produce single crystals to begin with but will introduce the floating-zone refining later this year. Monsanto, on the other hand, will produce float-zoned single of the P-type resistivity and doped float-zoned single crystals of the P- or N-type from the beginning. Both Upsil and Monsanto, as do I.C.I., will sell lump and rod silicon for customers to carry out their own doping and crystal forming.

The manufacturing capacity of silicon has increased, and is increasing, to such a large extent in the U.K. that it is difficult to see all the silicon produced being absorbed into the semi-conductor industry, and the question of whether another semi-conductor will supersede silicon as silicon has so rapidly replaced germanium also comes to mind. I.C.I. for one are confident that, as the new semiconductors being studied at present are normally two element systems, silicon will retain its superiority for at least the next five to 10 years.

## New U.K. Firm Makes Extra Pure Silicon

A RECEPTION was held on 18 May to mark the introduction of Upsil Ltd., a Pechiney-Uclaf company, which will distribute extra pure silicon, manufactured by Uclaf Ltd., at Stratford, E.15, according to the Pechiney process, in different polycrystalline forms (see also page 574).

Upsil will also distribute to the British market the chemical products produced by Uclaf in France, for the electronic and nuclear fields, and the rare metals and materials produced by Pechiney for the same industries. These include tantalum, niobium, beryllium, barium, strontium, graphite and zirconium.

## Anglo-French Firm to Make Germanium Diodes

FORMATION of a company under the joint management of U.K. and French entities, to produce gold-bonded germanium diodes and other devices on a large scale, has been announced.

Mining and Chemical Products Co. Ltd., and the semi-conductor division of Compagnie Francaise Thomson-Houston will jointly manage the new company, entitled M.C.P. Electronics. The move is seen as part of recent moves to forge closer links between Britain and France in various technical fields.

The new company will also market in this country the full range of transistors, diodes and rectifiers produced by C.F.T.H. in France.

## *Project News*

### Contracts for Rosedowns Vegetable Oil Plant

● Two contracts valued at nearly £200,000 for complete vegetable oil mills, both of which incorporate refining and deodorising equipment, have been received by Rose, Downs and Thompson Ltd., Old Foundry, Hull, a member of the Power-Gas Group. The first mill is to be erected in West Africa and will incorporate four Rosedowns 'long-cage' 'D' type Maxoil-Duplex high pressure expellers and one L.C. prepressing expeller. The second mill destined for the West Indies will process 40 tons of oilseeds a day in two 'long-cage' 'D' type expellers.

● A CONTRACT, valued at £800, has been awarded to William Boby and Co. Ltd., by Fisons Ltd. for a second demineralisation unit for their Levington Research Station. This is a repeat order designed to increase the capacity, the first unit being supplied by William Boby some four years ago.

### World Potash Meeting

The seventh International Potash Congress is to be held in Amsterdam in July. Organisers are the International Potash Institute, Berne, Switzerland.

New research and colour application laboratories of CIBA Clayton Ltd.

# LORD DERBY OPENS NEW CIBA CLAYTON LABORATORIES

NEW research and colour application laboratories for CIBA Clayton Ltd., Manchester 11, were opened on 24 May by the Earl of Derby at a ceremony attended by the Lord Mayor of Manchester, Alderman Harold Quinney, and Sir Arthur Vere Harvey, M.P., chairman of the CIBA Group in the U.K. Also present were directors of the firm and senior corporation officials.

With these new laboratories the CIBA company have extended the scope of their research into the shrink resistance and flameproofing of fabrics and the discovery of new and outstanding finishes. It has also increased its facilities for technical service to the many other colour-using industries.

New finishes and improved methods of colour application can be rendered practicable propositions on the basis of costs and improved efficiency of processing, by research and controlled experiments. The research work of the CIBA organisation is carried out on a collaborative basis with trade associations and university and technical research establishments, and the textile trade will have the opportunity of collaborating in the research work for which the new laboratories are designed.

## *Potent Organo-phosphorus Insecticide Introduced by Dow Agrochemicals*

A NEW insecticide claimed to be capable of controlling all fly and insect pests, including those resistant to DDT, has just been placed on the market by Dow Agrochemicals Ltd., 48 Charles Street, London W.1, under the name of Nankor. It is a 'wide-spectrum' insecticide.

The insecticide is produced as a wettable powder, as an emulsified concentrate, in aerosol forms for residual and space sprays, and as granules and dust. It is an organo-phosphorous compound, whose active ingredient is 0.2.4.5-trichlorophenyl phosphorothiocate, and it is "rapidly metabolised in the mammalian system. The metabolites, which are non-toxic, are excreted in the urine."

One of the valuable qualities claimed for Nankor is that despite this rapid breakdown in mammalian systems, it possesses a remarkably long active life when sprayed on 'dead' surfaces, such as inside walls of buildings, on doors, windows, floors, buildings, ceilings. These residual effects last from four to eight weeks, and it has no appreciable smell.

Numerous public health applications are suggested by Dow, including refuse tips and containers, dock warehouses, restaurants, food handling establishments, and meat packing plants where its toxicity to cockroaches is said to be of particular value.

Domestically the aerosols can be used on pets, on windows, doorways, kitchen sinks, dustbins, garden refuse heaps or other places where flies congregate. For this use spraying a solution to which three ounces of sugar to a gallon of spray has been added, is recommended.

Nankor will retail in packs varying from a two ounce aerosol up to 25 gall. emulsion drums and 50 and 100 lb. packs of dust and wettable powder. In due course it will also be manufactured at the company's new factory at King's Lynn, Norfolk.

## Chemical Quotas in New U.K./Polish Pact

CHEMICALS and basic materials were included in the details of the new trade agreement signed in London last week between representatives of the U.K. and Polish Governments, providing a basis for trade for the three-year period beginning 1 July 1960.

Import quotas on both sides will be negotiated annually; those for the 12 months from the above date envisage an increase in U.K. exports from £16½ million in 1959 to about £20 million, and an increase in Polish exports from about £33 million to £35 million.

★ POLYMER chemists will be intrigued by the announcement of Artrite Resins, Camberley, that they have developed new polymeric materials that can withstand temperatures up to 500-600°C, as well as new materials based on resin products having ceramic-like properties, including resistance to temperatures of some 1,000°C.

At the opening of the company's new factory last week, Dr. G. Ader, a director, spoke of a "new chemical process" leading to the discovery. As the materials are the subject of defence contracts, no details can be released. They are, however, said to have excellent thermal shock resistance and may also be useful in nuclear applications for shielding and for cladding fuel elements. The materials will not be much more expensive than existing high-temperature materials.

Dr. Ader felt that Britain was so far leading the West in this new field of chemistry and that the discoveries might completely revolutionise missile and rocket production. The new Artrite factory has been built specifically for the production of polyester resins. Another B.T.R. Industries subsidiary, Glass Yarns and Deeside Fabrics, also has a new plant at Camberley where large-scale production is under way on various types of glass fibre reinforcement for use with polyester and epoxy resins.

★ I WAS interested to learn of the successful applications already being reported for the chemical compound developed by Crow Oil Ltd., of Cardiff, which is being used to deal with oil deposits on beaches at a number of resorts, including Bournemouth, Margate and Plymouth.

Originally (about a year ago) a compound was designed to cope with separation of oil from the sludge left in oil tankers after discharge, and now, I hear, the firm's chemists have produced another 'secret'—Compound M. This, when sprayed on oily patches on seaside beaches is claimed rapidly to dissolve the oil into a milk-like substance which is washed out to sea by the tide. In other applications it can be sprayed away with fresh water. It has also been taken up by the British Transport Commission for use at the docks, and costs appear reasonable. One gallon, costing 10s 3d will treat an area of 250 sq. ft.

★ WHAT will doubtless prove a thoroughly sound investment in process research and development has been made by the Balfour Group of Companies with the opening of their new laboratories and pilot-plant facilities at Leven, Fife. In the old days, British chemical engineering concerns were often content to leave process research to the chemical companies or to buy licences for processes that had been developed overseas.

The past few years have seen big changes, and the British industry is no longer concerned only with the fabrication of process vessels, pumps and valves. It has entered both the process development and the main contracting fields.

The contribution that the new Balfour Group Research and Development Centre can make to the lowering of costs and raising of efficiency is great. This is the kind of development that should induce the chemical industry to co-operate more freely with the chemical plant industry on research, design and contracting.

★ PROPOSALS during the past 20 years for the amalgamation of the two bodies, the Institute of Physics and the Physical Society, evoked by the increasing overlap in their activities and in their membership, have at last been adopted with incorporation on 17 May of 'the Institute of Physics and the Physical Society'.

The qualification for the awards of Fellow and Associate of the Institute of Physics, and that of Graduate, will remain unchanged, and members of the new body holding these diplomas will also be Fellows of the Physical Society. In addition to the three Institute of Physics' grades of membership there will be the grade to be known as 'Fellow of the Physical Society,' and I understand that all the Fellows of the old society will automatically be transferred to this new grade, though new candidates for election will be required to possess a degree or diploma in physics recognised by the Council, or "to satisfy the Council that they have a sufficient knowledge of physics".

Dr. H. R. Lang is secretary to the new body, whose offices and headquarters are at 47 Belgrave Square, London S.W.1.

★ PROCESSING of several related inorganic materials wet with hydrochloric acid at high temperature in a continuous rotary dryer presented a troublesome corrosion problem at one U.S. chemical plant until recently it was overcome by using a reinforced polyester resin. At one stage of the process, solids wet with HCl are treated in a drum dryer, where they are subjected to air heated to 225°F (high limit set at 290°F). Vapour comprising free HCl and water, passes through the exit housing for separation from the material being dried. Severe corrosion resulted, causing equipment damage and product contamination.

To combat this tough corrosive condition, glass-fibre-reinforced polyester resin was suggested as a replacement for the original metal alloy dryer. A new dryer was fabricated in Hetron 72, a product of the Hooker Chemical Corporation, the unit including the exit gas separator housing, gas entrance and product discharge housing, and internal dryed lifting flights.

Now, after more than six months' service, the dryer shows no sign of corrosion, interior surfaces reflect only negligible wear by erosion of the solids being dried and, of course, the products themselves remain uncontaminated. Besides providing resistance to high temperature and corrosion, Hetron 72 is also inherently fire retardant.

★ A POSSIBLE new use for sulphur may emerge from tests being carried out by the U.S. Southwest Research Institute. The preliminary tests show that compressed sulphur has tensile (160 p.s.i.) and compressive (3,300 p.s.i.) strengths greater than those of conventional concrete. S.W.R.I. are considering the possibility, among others, of a transport 'vessel' made of sulphur, but many design and economic problems remain to be solved.

★ DIFFICULTIES in the Blue Fields, South Africa, are referred to by Mr. Giles Newton, chairman of the Cape Asbestos Company Ltd., in his annual report. Apparently the main cause of concern has been the reduced demand for Blue fibre, following excessive production of Canadian Chrysotile and an invasion of the market by large quantities of Russian fibre. In certain products, both can be substituted for Blue to a marginal extent.

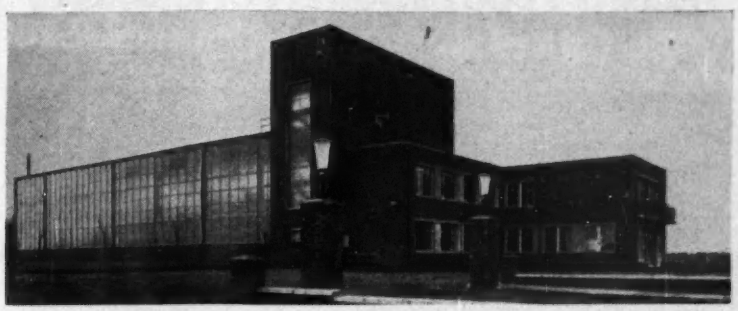
Although stocks in South Africa have risen considerably, the market is by no means saturated. While these stocks are in excess of the company's immediate shipping plans, the mines can now operate on a flexible basis and can rapidly be adjusted to fluctuations in demand.

Mr. Newton says that technically the Blue and Amosite mines have seldom been in better condition and long-term indications give "good cause for satisfaction". Both types of fibre are to be supplied to the U.S. Government under a very large contract.

Alembic

# NEW BALFOUR GROUP RESEARCH CENTRE

## Aim is Better Plant at Lower Cost



New Research and Development Centre, built at a cost exceeding £130,000

THE new research and development centre of the Balfour Group of companies, opened in the company's 150th anniversary year, at Leven, Fife, on 27 May by Mr. J. S. Maclay, Secretary of State for Scotland, houses under one roof a comprehensive series of modern laboratories integrated with a complete installation of pilot plant embodying all the main types of processes and equipment in use today.

One of the main aims in chemical engineering will be to supply better plant at lower cost, combining efficiency and economy in running costs with high product quality. Development work will seek to improve the design and operation of plant, to devise new methods of approach and to determine more accurately than before the sizes, capacities, number of stages, operating temperatures, flow arrangements, etc., of the plant under design.

Complete processing systems can be analysed, tested and evaluated in terms of size, output, operation, number of stages involved, operating temperatures, flow arrangements and so on, so that the most efficient conditions for the production of a successful end product will be ensured before expense is incurred on installing full-scale plant.

### *Utmost Flexibility*

The plant layout has been largely designed on a Meccano principle and the strategic deployment of equipment gives the utmost flexibility to every operation. For instance, it is frequently necessary to employ a series of unit operations or to combine several items of equipment to produce the most economical and effective process. The laboratories are so planned that plants can be changed from one process or raw material to another in the shortest possible time, with the help of interchangeable components and ancillaries. This flexibility allows the Balfour Group to tackle any problem within the broad framework of chemical engineering from simple storage to a complete process.

Pilot plant is available for the study of drying, mass transfer, heat flow, reaction and kinetics, evaporation, distillation, fractionation, size reduction, mixing, emulsifying and so on. With this equipment and their specialised knowledge in the field of construction materials for corrosive conditions, high temperatures, high pressures and high vacuum technique, almost any plant can be designed and manufactured for the chemical, pharmaceutical, gas, oil, petroleum, food, dairy and brewing industries.

The technical problems of evaporation have received special attention by the Scott Division and the pilot plant is perhaps the most versatile in the research centre. Designed for rapid conversion to any of the many methods in use, it ensures that full-scale plant supplied gives optimum performance with lowest installation cost.

Because the process of distillation occurs so widely in chemical engineering, a large section has been devoted to facilities for developing the latest methods. Molecular distillation—one of the most advanced developments claimed for the group—can also be demonstrated and tested on new materials. Applications under active study include distillation of materials with molecular weights above 250, which includes vitamins, hormones, sterols, plasticisers, petroleum fractions and vegetable oils.

The medium vacuum distillation pilot plant has a diphenyl oxide heating system and multi-stage condensers that run at a few millimetres. This versatile plant can be coupled to two different types of fractionating column, one the normal bubble plate type, and the other with a special grid packing, all constructed in stainless steel.

A sludge pump for dealing with slurries and semi-solids can be studied under actual operating conditions. An interesting installation in the centre is the new Scott-Wemco torque-flow pump, which has a recessed impeller completely out of the flow pattern and is virtually non-clogging. This enables it to handle high content slurries and sludges or the most fragile materials without damage.

One important section handles further development of the Pfaudler glassed-steel process to keep ahead of requirements for process and storage vessels using highly corrosive materials, like strong acids and alkalis, often at high pressure and temperatures.

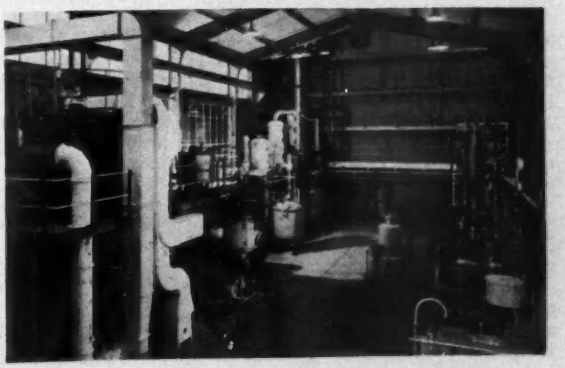
A special solvents laboratory, isolated from the main block, handles processes where inflammable solvents and other noxious materials may be used.

A function of the centre is the provision of training facilities in every sphere of chemical engineering. In conjunction with local technical colleges a student and graduate apprenticeship scheme exists by which suitable young men and women can reach full professional status in the best possible conditions while receiving industrial training. In certain cases, training facilities may be accorded to clients' personnel.

Comprehensive general services are also provided throughout the building and contribute largely to the speed and accuracy with which problems, routine or otherwise, can be tackled. There is steam up to 300 p.s.i., compressed air at 10 p.s.i., vacuum, gas and water mains, electric busbars supplying various voltages, galleries giving access to plant, etc.

The Balfour Group comprises Henry Balfour and Co. Ltd., George Scott and Son (London) Ltd., Ernest Scott and Co. Ltd., and the associated company, Enamelled Metal Products Corporation (1933) Ltd. The group has subsidiaries and agencies in all parts of the world.

The company has more than 1,200 employees and the Leven works are equipped to produce anything from a small component to a complete plant. A staff of fully qualified engineers will go anywhere in the world to supervise installations and the commissioning of plant and, if required, the training of operating staff.



General view of the main pilot plant hall

# Road Preparation Work Starts at I.C.I. Severnside Site

**Road preparation work is in progress for development of I.C.I.'s new chemical complex at Severnside. Seen with Dr. H. J. Hirst, general manager of Severnside works (fifth from right), is Mr. P. Hogan, Geo. Wimpey and Co.'s site agent (fourth from left), together with members of the staffs of both companies**

## *British Visqueen Introduce First U.K. Polypropylene Film*

THE first British polypropylene film is now being made by British Visqueen Ltd., Stevenage, Herts, an I.C.I. subsidiary. The film is being extruded as continuous unoriented sheeting from Propathene granules supplied by I.C.I. Rolls can be obtained from British Visqueen Ltd. in widths up to 36 in. and in thicknesses ranging from 0.0005 in. to 0.005 in.

Resembling polythene film in appearance, polypropylene film has the following advantages: Higher melting and softening temperatures; better clarity; superior oil resistance; lower gas permeability; greater stiffness; greater tensile and yield strength; freedom from stress cracking.

Polypropylene film melts at 170°C, and can be used under stress up to 100°C to 120°C. This should make it attractive for 'boil-in-the-bag' foodstuffs packs and surgical sterilisation packs. It is likely, too, to find use as a material for textile packaging and overwrapping. Oily machine parts, foodstuffs containing fats or greases and lubricating oils may safely be packaged in polypropylene film. It should also be suitable for packaging soaps and detergents, because of its resistance to stress cracking.

## Analytical Chemistry in New A.E.I. Labs

AN interesting chemistry and materials section is a feature of the new research laboratory which is commencing to carry out work for the Product Divisions and companies managed by Associated Electrical Industries (Woolwich) Ltd. (formerly Siemens Edison Swan).

Opened last Tuesday by Lord Chandos, chairman of A.E.I., in the presence of guests representing Government scientific engineering departments and leading executives of British industry, the new buildings, modern and functional in architectural style, are located at Harlow, Essex, some 25 miles from the centre of London.

Although much of the work of the chemical analysis section is, of course, familiar to chemists throughout industry, it will be of great practical assistance to A.E.I. in adapting materials to fit the particular requirements of electrical and electronics production.

Current work in chemical analysis includes microanalysis by polarography; automatic titration with emphasis on analysis of metallurgical products and ferrites, and gas chromatography. The section, which has only been in operation for a short time, has already made strides in improving the high-temperature qualities of polythene by irradiation by an electron beam, and by ultra violet rays, in the presence of a suitable activator. Cross-linking by subjecting the materials to a 'vulcanisation' process, as commonly applied to rubber-like materials, is also under investigation.

### Monsanto's First Rubber Chemicals Book in Chinese

Monsanto Hianqpyi Huahshyue Piin, well known in the West as Monsanto rubber chemicals, will become more familiar throughout the Orient now as a technical bulletin on rubber chemicals printed in Chinese has been printed by Monsanto Chemicals Ltd. Although Monsanto advertise widely in many Far Eastern languages, this is the first publication in an Asiatic language and it is believed to be the first of its type produced by any British chemical manufacturer.

### Polyvinylidene Chloride Papers from Metal Box

METACOTE, a new barrier material with exceptional protective qualities available from the Plastics Group of the Metal Box Co. Ltd., 37 Baker Street, London W.1, is coated with polyvinylidene chloride (Saran). Metal Box have installed special coating equipment, and coated papers are the first Metacote products to be marketed. They are available printed in reels or flat packets, or in wide unprinted reels for subsequent conversion.

Metacote packs are particularly suitable for a wide range of powdered and granulated products, including foodstuffs, detergent powders, disinfectant powders, dyestuff powders, dental plate cleaners, home perm powders, and rodenticides.

Among the outstanding packaging characteristics of Metacote are freedom from odour, impermeability to gasses, excellent moisture barrier properties, good fat and oil resistance, and ability to be heatsealed.

It is anticipated that Metacote packaging materials other than coated papers will become available, including combinations incorporating aluminium foil.

### Cambridge R.I.C. Members Form New Sub-section

A NEW sub-section of the London Section, Royal Institute of Chemistry, to provide more R.I.C. activity in Cambridgeshire and district was formed at a recent meeting held at the Technological Research Station of Spillers Ltd., Cambridge. Mr. F. C. Hymas, London Section chairman, who presided over an attendance of about 50 members welcomed the idea.

Nearly two-thirds of local membership had replied to a questionnaire approving the venture. Of these, over 70 had promised to attend meetings. Discussion showed that members would appreciate a programme of about six meetings a year based, for the first year, on Cambridge.

It was proposed by Mr. C. F. Hadley and seconded by Dr. A. J. Duke that a sub-section be formed, and this was carried unanimously. The following were elected to the sub-section committee: Chairman: Dr. J. Williams (chief chemist, Spillers Ltd.), hon. secretary, C. F. Hadley (CIBA (A.R.L.) Ltd., Duxford); committee members, Mr. G. E. Boynton (CIBA (A.R.L.) Ltd.; Dr. A. J. Duke (CIBA (A.R.L.)); Mr. J. F. Harris (Fisons Pest Control Ltd.); and Dr. F. G. Mann (reader in organic chemistry, Cambridge).

### Pharmaceutical Society Calls for Control of New Medicinals

One hundred and sixty representatives of branches of the Pharmaceutical Society in England, Scotland and Wales decided, at their recent annual meeting in London, that the society should press for legislation to ensure that no new substance introduced for medical treatment should be supplied to the public, except on a doctor's prescription, until sufficient evidence was available to justify release from such control.

## Isopad Film on Electric Surface Heating

PRODUCTION of electric surface heaters in the factory of Isopad Ltd., Barnet By-Pass, Boreham Wood, Herts, was demonstrated last week by a technical film produced by the company and showing various types of heater and systems of control.

The film, in black and white (running time 25 minutes), takes the audience into some industrial plants, including the chemical plant of F. W. Berk, and the Esso refinery at Fawley, and illustrates uses of the company's products in research laboratories, in distillation, the heating of pipelines and containers, and also in the curing of fibreglass mouldings.

'Isopanels' also made by the company, are used to maintain storage vessels at correct temperatures, and are now coming into use on road and rail tankers to facilitate transportation of highly viscous fluids over long distances in a liquid state. The company's products, including their ranges of heating tapes and controls for flameproof areas, will be on show at the Pipe and Pipeline Exhibition due to open at Earls Court on 30 May.

## World Congress on Patents and Trade Marks

THE 24th congress of the International Association for the Protection of Industrial Property will be held in London from 30 May to 4 June, under the patronage of the Duke of Edinburgh, 1,300 members from 40 countries will be attending. Formal inauguration by the Lord Chancellor, Viscount Kilmuir, will take place at the Royal Festival Hall at 8.30 p.m. on 30 May. Other speakers will be Sir John Hanbury-Williams, congress president, and Mr. G. W. Tookey, president of the British group of the association.

Working sessions on 31 May, 2 and 3 June will be held at St. Pancras Assembly Rooms. Subjects for discussion include unification of patent laws, international protection of industrial designs and various more detailed proposals for achieving better international protection of inventions and trade marks.

### Greater Co-operation—an "Interesting Experiment"

The influence of the individual in original scientific work is strong and usually beneficient but in those subjects which lie between the academic and technicological there might be a division of labour. Greater cooperation among the nations along such lines "would be a most interesting and valuable experiment in human relations." This suggestion was put forward by Sir Cyril Hinshelwood, O.M., president of the Royal Society, when he opened the first International Ceramic Congress to be held in the U.K. Sir Cyril said that it was wrong to think of ceramics as an industry devoted to the small-scale personal needs of the community. The study of refractories alone had become a major part of chemical engineering.

# WORLD EXPERTS FOR S.C.I. POLYMER SYMPOSIUM

SYMPOSIUM on high temperature resistance and thermal degradation of polymers will be held by the Plastics and Polymer Group, Society of Chemical Industry, at London University on 21, 22 and 23 September. Symposium chairman will be Professor H. J. Emeléus, C.B.E., F.R.S., and the opening address will be given by Sir Owen Wansbrough-Jones, K.B.E., C.B.

Papers will be presented in the William Beveridge Hall on 21, 22 and 23 September, with an additional meeting on 22 September in the Institute of Education assembly hall, as follows:

*21 September :* 'Inorganic polymers containing silicon-nitrogen bonds,' by B. J. Aylett *et al.* (Aberdeen Univ.); 'H.t. behaviour of polyphosphonitrilic chloride,' by F. G. R. Gimblett (Brunel Coll of Tech.); 'Preparation and application of lithium polyphosphates,' by D. N. Hunter (Artrite Resins); 'Inorganic polymers,' by R. A. Shaw (Birkbeck Coll.); 'Thermal degradation of polymers with main inorganic chains,' by K. A. Andrianov (Chem. Science Dept., Moscow); 'Principles of polymer stability,' by H. Mark (Brooklyn Polytechnic); paper by P. Bloomfield (Artrite).

*22 September :* 'Studies in side-chain degradation of some acrylic and methacrylic ester polymers,' by G. E. J. Reynolds (Vinyl Products); 'Competitive routes in the pyrolysis of polyesters and related systems,' by P. D. Ritchie (Glasgow Univ.); 'Effect of branching on thermal degradation of polymers,' by L. Wall (U.S. Nat. Bureau of Standards); 'Recent advances in theory of thermal degradation of heterodisperse polymers,' by M. Gordon (A. D. Little Research Institute); 'Thermal discoloration of nitrile polymers,' by N. Grassie and J. M. Hay (Glasgow Univ.); 'Current status of and problems in the kinetics of polymer degradation,' by R. Simha (Univ. of S. California); 'Thermal degradation of polymers at temps. up to 1,200°C,' by S. L. Madorsky (N.B.S.).

*22 September (Institute of Education):* 'Polyphenylene oxides,' by J. H. Golden (Min. of Aviation); 'Thermal degradation of polymeric materials, fluorine-containing polymers, polyphenylenes and polyphenylene oxides,' by W. W. Wright (Aviation Min.); 'Polymers containing fluorine,' by R. N. Haszeldine (Manchester Univ.); 'Organo-arsenical polymers,' by T. P. Hobin (Aviation Min.); 'Boronic acid derivatives,' by S. Fordham and W. R. Bamford (I.C.I.); 'Experimental approach to preparation of applicable borazole derivatives,' by W Garrard (Northern Polytechnic); 'Boron-nitrogen compounds,' by H. S. Turner (Nat. Chemical Lab.).

*23 September :* 'Thermal degradation of some polyamides,' by B. Kamerbeek (N.V. Onderzoekingsinstitut Research, Arnhem); 'Embrittlement of polyamides; its mechanisms and preventive treatment,' by G. W. Harding (Aviation Min.); 'Thermal degradation of polyethylene terephthalate,' by E. P. Goodings (I.C.I.); 'Thermal oxidation of Ziegler polyethylenes,' by R. N. Haward *et al.* (Shell Chemical); 'Degradation of polypropylene,' by P. W. O. Wijga (Koninklijke/Shell Lab.); 'Thermal ageing of electrical insulating films,' by L. Bridge and W. Simpson (Metrovick); 'Investigation of thermal degradation of phenolic resins,' by G. F. Heron (Ferodo).

## *I.C.I.'s Plastics Exhibition in Moscow*

AMONG the impressive list of items to be shown in Leningrad and Moscow during June and July by the I.C.I. Plastics Division will be an Alkathene boat made by the Engel process, an Austin Seven saloon car illustrating the use of the company's plastics in the motor industry, and a variety of sanitary ware.

This latter will comprise a section of a bathroom showing Perspex equipment and p.v.c. flooring. There will also be on display samples of rigid p.v.c. tubing conveyor belting for foodstuffs and mines, and show cases with mounted samples.

The division, organisers of the exhibition, will produce a 4-page newspaper describing the show and listing the companies who have supplied the exhibits. Receptions will be held in Moscow and Leningrad immediately after the openings which will be attended by the British Ambassador.

Among the series of lectures to be given in conjunction with the exhibitions are: 'Injection Moulding of Alkathene', by C. D. Dunkley; 'The shaping of thermoplastics with reference to domestic applications', by P. H. Collins; and 'Polythene film, applications and production' by S. J. Barker. Dates of the exhibitions are: Moscow 3-17 June; Leningrad 15-29 July.

## Research on Electrode Systems

IMPORTANT among the new electrode systems on which basic research is currently in progress at the Chloride Electrical Storage Co.'s laboratories near Manchester (officially opened on 20 May) is that using silver oxide and zinc electrodes with caustic potash electrolyte.

This, it is stated, can give about five times the output in relation to volume and weight compared with either lead-acid or nickel-cadmium-alkaline systems, though it carries serious disadvantages. Research aimed at improving its life and reliability could thus open up much wider fields of application.

Work is also in progress on fuel cells in which a process the reverse of the normal takes place; i.e., in which, during overcharge, oxygen and hydrogen are normally evolved. Under study are porous electrodes which ionise oxygen and any fuel gases which can be effectively oxidised—at present using hydrogen as fuel, though later the intention is to include other gases and solid fuels and to experiment in varied conditions of temperature and pressure.

Fundamental studies are also being undertaken with the purpose of still further improving conventional lead-acid batteries, and those that employ nickel-cadmium, or iron, electrodes in an alkaline electrolyte.

# A. D. Little Find New Route to Range of Sucrose Derivatives

SCALE and scope of the activities of the Arthur D. Little Research Institute, Inveresk, increased during 1959, the third year of its operation. Investigations undertaken by the independent sponsored research organisation have been financed by Government agencies and by industrial firms in the U.K. and the U.S.

Preparations are in hand to undertake a study in a branch of aluminium chemistry on behalf of the U.K. Atomic Energy Authority and to investigate the chemistry and polymerisation of ethylene sulphide for a European sponsor. The institute is now prepared to undertake studies in most branches of the natural sciences using teams of any size.

*Sucrose Chemistry.* Work on the chemistry of sodium sucrates devised to find new non-food uses for sucrose has continued under the direction of Dr. W. A. P. Black, deputy director, and has led to a new route for the preparation of a wide range of sucrose derivatives of potential value, including the sucrose fatty esters. The most outstanding problem, that of removing 'bound' ammonia from the sucrates prepared in liquid ammonia, has not been completely solved, but further condensations have been carried out with trisodium sucrate and after extraction with dimethoxyethane, a product resulted with only 0.2% of ammonia, but part of the sucrate was converted in the process into the sodium hydroxide addition compound.

## Optically Active Derivatives

Optically active sucrose derivatives have been prepared by condensing benzene- and dimethoxyethane-extracted trisodium sucrose derivatives with 2-chloro-4,6-bis(2'-chloro-4'-nitrophenoxy)-*s*-triazine, such compound being known to have fungicidal and insecticidal activity.

The epichlorhydrin polymer from a monosodium sucrate has been gamma-irradiated to a total dose of $10^8$ rads and then extracted with boiling water to remove low mol. wt. degradation products. The extracted polymer was recovered in 88.2% yield and irradiation was found to cause no decrease in the nitrogen content.

*Glucose.* A successful start was made to a new project on the study of polymers of glucose and its derivatives and monomers had been prepared of substituted glucoses and of dimethylenemannitol. Glucose holds promise for the development of new type polymers that could have properties and uses different from those of the natural polysaccharides. Sponsors are the U.S. Department of Agriculture.

In the initial stages on work leading to epoxy resin-type polymers, the possibility of condensing substituted glucoses or derivatives of glucose with epichlorhydrin followed by polymerisation has been explored. Experiments have been made with 2,4:3,5-di-*O*-methylene-D-mannitol, a symmetrical molecule with free hydroxyl groups at both ends. D-Mannitol is readily prepared from glucose by catalytic hydrogenation. A quantity of di-*O*-methylenemannitol has been synthesised, for condensation experiments by preparing the 1,6-dibenzoylmannitol, followed by methylenation and debenzoylation.

Initial experiments have also been carried out on the preparation of allyl and vinyl ethers of suitably substituted glucose with a view to polymerisation.

*Polymers.* In a polymer study, jointly sponsored by U.K. and U.S. companies, it was hoped to develop new techniques for studying the Ziegler polymerisation of α-olefins, kinetically, at ordinary pressure, and to determine the mechanical properties of the polyolefins formed. Later in the year work was initiated on a study of the bulk properties of high polymers that should contribute to a more rational and quantitative basis for the selection of polymers for specific applications by 'tailor-making' polymers with specific properties.

Studies have also continued under Dr. M. Gordon, assistant director, on the measurement of viscosity, polymer fractionation, bulk properties of linear polythene, surface-chemical mechanism of heterogenous polymerisation and statistical kinetics of the degradation of polymethyl methacrylate.

*Corrosion.* Work in the corrosion field, under the direction of Dr. P. Hersch, has been particularly fruitful. As the result of the development of two simple but rapid methods of assessing inhibitory power, 450 organic compounds have been tested. Although the results have not allowed any clear-cut correlation to be established between chemical constitution and their merit as inhibitors, they should eventually be of great value in providing generalisations and are expected to permit a more scientific selection by industry of compounds likely to be effective as inhibitors. Electrochemical methods used to study inhibition have also given interesting results, but have indicated that the mechanism is very complex.

Evaluation techniques were extended to a large number of anionic inhibitors and had shown that various fatty acids, nitrophenates, nitrobenzoates, halobenzoates and maleic hydrazide had a strong inhibitory potency for steel, with only a few inhibitors among the diaoz-, nitroso-, organic phosphorus- and hydrazine-compounds examined.

*Wood.* Considerable progress was made by Dr. P. C. Arni and his colleagues in their study of the chemical modification of wood, chiefly by esterification reactions, aimed at improving the technological properties without detracting from strength properties. Methods to phosphorylate the cellulosic component of wood by non-degradative reactions had been studied with a view to obtaining marked improvement in flame-retardance, dimensional stability and biological resistance.

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*In Parliament*

# B.o.T. Discussions on U.K. Potash Purchases

THE Board of Trade has held consultations with Fisons, I.C.I. and other large buyers of potash, said Mr. F. J. Erroll, Minister of State, B.o.T., on Tuesday, in reply to a question in the House.

Although Potash Ltd. remained by far the largest supplier of potash in this country, competition from other sources had been increasing.

U.K. sales of potash from other sources in the calendar year 1959 were 44% higher than in the fertiliser year 1957-58, and represented 26% of total sales as compared with 20% in 1957-58. U.K. buyers of potash were always on the look-out for new sources of supply. Their general view was that the balance of advantage would be against closer integration of purchasing.

## More Details on A.E.A. Chemical Costs

The unnamed manufacturer of the chemical supplied to the A.E.A. (see CHEMICAL AGE, 21 May, p. 842) at a high rate of profit, which was the subject of recent questions in the House of Commons, refused to supply except on a cost-plus basis and costed on a minimum profit of 17% to 45%, it was stated last week by a Member of Parliament. In addition, the manufacturer insisted that the cost should include the mortisation of the capital expended on new plant over a period of five years.

The President of the Board of Trade was asked to note that the matter ought immediately to have been referred to the Monopolies Commission in order to show that it was quite improper that a powerful private monopoly should "hold up public interest to ransom in that way".

Mr. Maudling replied that he was waiting to hear the other side of the case.

## Sulphate of Ammonia Prices Raised

German and Belgian manufacturers of ammonium sulphate have agreed to raise their export prices by £2 10s a ton, consequent upon consideration of the application for an anti-dumping duty, it was stated in the House last week by the President of the Board of Trade. Asked whether he had reached a decision on the application for the removal of import duty, Mr. Maudling said he did not know when he would be able to announce a decision. The delay was due to the hearing in full of the opinions of all interested parties.

# CHEMICAL MERCHANTS' NEED FOR CHEAP AND FLEXIBLE INSURANCE COVER

SUFFICIENT consideration had not been given by the Export Credits Guarantee Department to the insurance cover that should be given on the type of contract that the merchant by virtue of the nature of his business was always undertaking. This was stated by Mr. Denis F. Waugh (Tar Residuals Ltd.), chairman of the British Chemical and Dyestuffs Traders' Association, at the annual lunch held at the Savoy Hotel on Tuesday. More than 400 members and guests were present.

Proposing the toast of 'The guests,' Mr. Waugh said that chemical merchants needed insurance cover that was cheap enough and flexible enough to cover their type of business—essentially it was required for short periods. He urged Government departments to realise that merchants' margins were low in comparison with those of manufacturers.

He was pleased to note signs of a possible coming together of the two trade areas in Europe. It was essential to the forward planning of their industry that they should have those problems solved as quickly as possible.

Mr. Waugh particularly welcomed Sir Cullum Welch, O.B.E., a former Lord Mayor of London who proposed the toast of 'The association', Mr. T. Clarke, representing one of the oldest advertising agencies, who replied to the toast of 'The guests', Mr. J. C. Hanbury, and Mr. George Brearley, vice-chairman and director respectively of the Association of British Chemical Manufacturers, Mr. C. F. Glassie, president of the British Plastics Federation and Mr. H. J. Carter, president of the Association of Tar Distillers.

### Late Victor Blagden

Responding to the toast of 'The association', proposed by Sir Cullum, Mr. C. W. Lovegrove (Charles Page and Co. Ltd.) paid tribute to their founder-president who died in March, Mr. Victor Blagden. Mr. Lovegrove was chairman under his presidency and he declared that Mr. Blagden had always been helpful and encouraging to those with whom he was associated.

Mr. Lovegrove was replying to the toast on behalf of the president, Mr. G. S. Bache (Reichhold Chemicals Ltd.) who was unable to attend owing to a recent accident. A telegram of good wishes was read from Mr. Bache and Mr. Lovegrove said the association had written wishing him a complete and speedy recovery.

Referring to trade in West Europe, Mr. Lovegrove said there were signs that a 'wind of change' was blowing. At their last annual lunch, Mr. Bache had referred to the great capital expansion in the U.S. chemical industry. Mr. Lovegrove thought that in spite of the recession, that had taken place in the U.S., there seemed to be little change in those programmes.

In regard to the 'Outer Seven,' he was sure that many members would agree that it was on the cards that political events might bring about a closer link between the two areas; any closer association might mean an all-round lowering of tariff barriers. The association must remain extremely vigilant and would have much work to do to safeguard the interests of its members. Those changes would give much scope for the merchants themselves who would need their association more than ever; he had no doubt they would be well served by it.

## Elliott-Automation Form New Developments Unit

A NEW company with the title E-A Automation Systems has been formed by Elliott-Automation Ltd., 34 Portland Place, London W.1, whose purpose will be to discover the need for new devices not yet in production. It will "point the way for the rest of the Group", which will then develop and still further extend the range of equipment offered in the automation field.

This was stated at a luncheon meeting held at the Savoy Hotel, London, late last week, by Mr. L. Bagrit, managing director and deputy chairman of E-A Automation, and chairman of Elliott Brothers, who went on to say that the new company will also search the world for inventions and advances in automation, with a view to making them available to industry in this country.

The luncheon was also given to mark opening of the Electronics and Automation Exhibition, which terminates at Olympia, London, on 28 May.

## *Drift to Two European Trade Blocs Might be a Calamity, say Merchants*

THE present concept of freer trade in Europe commanded the increasing attention of the British Chemical and Dyestuffs Traders' Association, states the annual report, and it was felt to be something of a paradox that the original proposals had led to a position that threatened danger of trade discrimination. The report was presented at the annual meeting on 24 May by Mr. Denis F. Waugh, chairman.

The convention establishing the European Free Trade Association providing for the reduction and elimination of tariffs and quantitative restrictions was perhaps a necessary step, but it might be a calamity if the outer seven and the 'six' of the European Economic Community were to drift into two tight trade blocs.

The rigidities experienced under a policy of high protection had already noticeably eased and in the long term, the U.K. industries were being forced to contemplate meeting foreign competition without import duty. A return to a policy of free trade would pose many urgent problems for U.K. merchants and manufacturers and there would be many opportunities for members of the association. A study of such a change in policy must be a matter of high priority to the British merchant.

More extensive use had been made of the Import Duties Act for obtaining temporary suspensions of duty in the past year. This procedure about which some dissatisfaction was expressed in the last annual report (see CHEMICAL AGE, 30 May, 1959, p. 903), was examined by the association with a view to seeking the removal of the frustrating uncertainty that resulted from short periods of suspension and of obtaining prompt notification for members of cases under consideration.

It was considered that a policy of recognition of the merchant and for the Government to place the merchant on an equal footing with the manufacturer was of primary importance and a memorandum setting out the association's views had been discussed with the President of the Board of Trade.

The report noted with interest that by the end of 1959, 44 formal applications had been received by the Board of Trade under the Customs Duties (Dumping and Subsidies) Act and that only in two cases had anti-dumping duties been imposed. An application was now being considered by the B.o.T. for an anti-dumping duty on ethanediol imported from the U.S..

It was stated that prospects for trade expansion were "certainly favourable, although there are serious problems yet to be solved." It was inevitable that competition in world markets would become more intense, but that the enterprise and resource of the British merchant should make a substantial contribution to the prosperity of the country.

## Bradford Post-graduate Course in High Polymers

A COURSE in high polymer chemistry for one academic year is announced by the Department of Chemical Technology, Bradford Institute of Technology. Successful students will be awarded a Post-graduate diploma of the Institute. About 100 lectures will be given in the chemistry of high polymers; about 50 lectures on polymer technology, including fibres, plastics, surface coatings and rubbers, about 40 lectures on general and economic studies.

Lecturers will include Dr. W. R. Moore, M.B.E., reader in high polymer chemistry, Dr. R. S. Asquith, senior lecturer in fibrous polymers and Dr. R. P. Sheldon, lecturer in polymer chemistry.

# NEW CROP CHEMICALS APPROVAL SCHEME IS WELCOMED BY A.B.M.A.C. MEMBER-FIRMS

FROM 1 June a new agricultural chemicals approval scheme will supersede the crop protection products approval scheme which has been in existence for 20 years. This was stated at the annual dinner in London on 18 March of the Association of British Manufacturers of Agricultural Chemicals by Mr. John Hare, Minister of Agriculture. Attended by a company of members and guests, the dinner was presided over by Mr. Harold Mellor (Plant Protection Co. Ltd.), newly elected chairman of the association.

The new scheme, said Mr. Hare, would enable the farmer to choose the right chemical. It had been realised for some time that the voluntary crop protection products approval scheme had certain shortcomings. He was grateful to the association for all the valuable help it had given to the Ministry in devising the scheme, in particular Mr. George Huckle (Shell Chemical Co.) for all the work he had put into the preparation of the scheme as chairman. He was sure that every member of A.B.M.A.C. would wish to do all he could to make the scheme the success it deserved to be.

Sub-title of the scheme was 'Insecticides, fungicides and herbicides', which indicated clearly the chemicals that would be covered.

## Main Advantage

Main advantage of the new scheme was that it would be possible for new products to be considered and, where appropriate approved before the manufacturer was ready to put them on the market. To the user that represented a clear advantage because it meant that from the first announcement of a new chemical he had a reliable assurance of its efficiency.

To the manufacturer, however, the new scheme would mean closer and earlier co-operation with the approval organisation, which would be situated at the Plant Pathology Laboratory, Harpenden.

Co-operation would have to take place at an early stage in the development of a new product, in fact by the time the manufacturer was ready to start field trials. Manufacturers would be expected to provide evidence of the efficacy of their chemicals as before, but under the new scheme, the Ministry would, where appropriate, provide for independent trials through the Advisory Services.

Mr. Hare added that the Ministry was already re-examining in close consultation with A.B.M.A.C. the claims for products approved under the old scheme before they were re-registered under the new one. He was "confident not only that the new scheme will have the effect of discouraging the use of unsatisfactory or inefficient chemicals, but that the display of the new approval mark will help you sell your products".

He hoped the manufacturers would put the new mark on the re-registered products and obtain approval for their new ones. The first approval list will be ready on 1 February, when a Press conference will be held to tell farmers and merchants about the scheme and to enlist their full co-operation, without which the scheme could not succeed. It was essential that farmers and merchants be persuaded that they could rely on approved chemicals and should choose them if they wanted their crop protection jobs done efficiently and well.

Replying to the Minister, Mr. Mellor welcomed the new scheme as an active measure to achieve the use of the best crop protection chemicals. Particularly welcome was the opportunity the scheme created for new products to appear on the market, fully approved, without undergoing a two-year waiting period.

Productivity by agriculture had risen 68% since the war and crop protection products had undoubtedly played a part in that achievement. It had been estimated that Britain would have to spend abroad another £400 million a year, every year, to secure the foodstuffs that that great increase in productivity represented.

The association aimed at providing effective products that could be used in complete safety to man and wild life. The co-operation of the association with the Ministry and farming interests was close and the members voluntarily accepted any special restrictions that might be called for under the voluntary notification and clearance scheme.

A wider membership permitting associate members was now possible under revised rules of the association, enabling overseas manufacturing companies, who marketed products in the U.K., to be eligible.

Mr. Mellor concluded by proposing the health of the guests coupled with the names of the Minister of Agriculture and Lord Hurcomb, president of the Council for Nature.

# New I.C.I. Silicone Products

SEVERAL new silicones, including some development products, that offer special advantages to manufacturers in the rubber, electrical, plastics, leather and textile industries, have been added to the silicones range of the I.C.I. Nobel Division. General purpose, high strength, fully compounded stocks, with superior mechanical properties to earlier general purpose stocks, are offered in the E 313 class—50 B.S., 60 B.S., 70 B.S., and 80 B.S. rubbers.

Usually the E 313 rubbers are supplied as white stocks, but a closely related class, containing red iron oxide to improve heat ageing characteristics at temperatures 200-250C°, is available. Both classes are suitable for hot air or live steam curing.

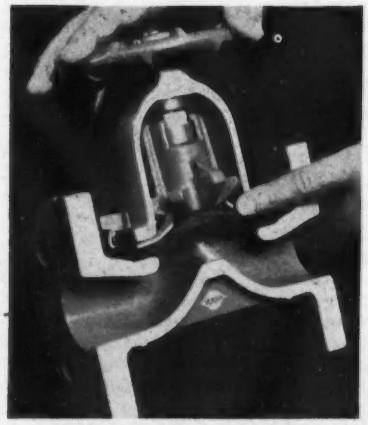
The new solvent-based silicone product M 492 is intended for water-repellency treatment of both textiles and leather. Besides imparting a high degree of water-repellency, it can be air-dried, thus eliminating the high temperature baking process that is usually necessary with silicone treatments.

Three development products are also available. The first, DP 115, is a silicone resin with great promise as adhesive and binding material. Supplied as a high solids content solution in acetone, the product, when applied, rapidly dries in air to give a tack-free film that cures on heating to give a rigid bond that is heat-stable and moisture-resistant. Recommended applications include its use in bonding silicone resin/glass cloth laminates to each other and to metal; as a moisture-proof coating for resistors and glass or asbestos served wire.

A second development product DP 163, is a silicone resin for semi-permanent release coatings on metal surfaces. This resin, dissolved in an aromatic solvent, can be applied by spraying, brushing or dipping. After curing at 200°C, it gives a hard smooth coating with admirable release qualities and long life, even at temperates of 200-250°C.

The third product, DP 137, formulated for the manufacture of expanded microcellular rubber, is neutral in colour but may be pigmented as desired. It can be used at temperatures from −80°C to +250°C.

## Terylene-reinforced Valve Diaphragms



**An entirely new use for I.C.I. Terylene is as reinforcement for valve diaphragms, tests having shown it to be superior to conventional materials for the job. Here is shown a section of an A type valve by Saunders Valve Co. Ltd., Cwmbran, S. Wales. The material is also increasingly used by the rubber industry for reinforcing conveyor belting, etc.**

# BERK AGRICULTURAL CATALOGUE INCLUDES NEW CHEMICALS AND FACTS ON MERCURIAL FUNGICIDES

IN view of the controversy about mercurial fungicides and the wide prejudice against the use of sprays, F. W. Berk and Co. Ltd. have included in their newly revised brochure of agricultural and horticultural products, facts culled from their own trials, work in research establishments, observations of fruit growers and chemical analyses of compounds containing mercury. The charges normally made against mercury fungicides on phytotoxicity, poisonous residues and danger of application are considered separately.

**Phytotoxicity.** Mercury compounds are relatively harmless to leaves and such damage as there is is no more than that found with dispersible sulphur, copper sprays and chlorfenson and less than the damage caused by lime sulphur. Superior yields of the mercurial treatment are attributed to its lower phytotoxicity and lesser damage to blossom. Phelam, in which half as much mercury is applied to the tree as in phenyl mercury chloride, is less phytotoxic than other mercury compounds; leaf damage caused by the other phenyl mercury compounds is about the same, whether combined as chloride, acetate, nitrate or urea.

## Copper Oxychloride

Experiments with six times the recommended dose of mercurised copper oxychloride have been carried out without any phytotoxic damage to potatoes. Mercurised products are better than copper oxychloride as the inclusion of mercury halves the amount of copper in the spray and, therefore the damage resulting from it.

To improve the chlorophyll content, the most practical recommendation is that magnesium sulphate and urea, both compatible with Phelam, be applied occasionally to the trees.

**Mercury Residues.** New Zealand workers have applied 17 phenyl mercury salicylate sprays to tomatoes, yet the difference in mercury residues in sprayed and unsprayed tomatoes was hardly significant, being 0.010-0.075 p.p.m. and 0.00-0.044 p.p.m. respectively. F. W. Berk's own results show that their materials leave residues well within the official limits.

Long Ashton workers using PMC and phenyl mercury nitrate for apples and estimating the residues by the dithizone method, confirmed the Berk results by obtaining the following figures at harvesting: Peel, 0.01 p.p.m.; flesh, 0.04 p.p.m.; core $<0.005$ p.p.m. If Phelam were used instead, the residues might be expected to be less than those. When MCO was applied to potatoes, mercury residues naturally presented no problem.

**Safety Precautions.** Organo-mercury fungicides are not included in the Agricultural (Poisonous Substances) Regulations and Phelam has been approved under the Crop Protection Products Approval Scheme. Precautions for usage and handling are described.

The company's new brochure also gives metric conversion tables; a compatibility table for fruit sprays and notes on Micronising; notes on the company's aerial spraying services; useful indexes to fungus diseases and pests; and the following chemicals, some newly developed, are included for the first time.

A new cotton seed dressing, Leytosan C, is a mixture of mercuric chloride and mercuric iodide, equivalent to 5.67, 8.5 or 11.33% Hg. The active ingredient has a corrosive action on proteins. A new liquid seed dressing for the control of various diseases of cereals and certain other crops has an active ingredient of 1.43% methylmercurybenzoate $CH_3.Hg.O.CO.C_6H_5$ (0.85% Hg).

A cotton dust, conveniently applicable for the simultaneous control of a wide variety of insects and mites, has an active ingredient of 40% sulphur, 10% DDT, 3% Gamma BHC. Also in the insecticide range are the Heptachlor 50% dispersible powder (1:4:5:6:7:10:10-heptachloro-4:7:8:9-tetrahydro-4:7-*endo*-methyleneindene) for the control of wireworm and other soil pests. 2½% Heptachlor dust is a free-flowing product.

New to the list is sulphuric acid, a general purpose weedkiller and potato haulm destroyer, leaving no poisonous residues. Active ingredient is (1) C.O.V. or R.O.V. containing 95-98% $H_2SO_4$ and (2) B.O.V. containing 77-80% $H_2SO_4$. Magnesium sulphates have also been added to the list as follows: (1) agricultural magnesium sulphates, Epsom salt (17% MgO); (2) kieserite (29% MgO); (3) calcined magnesium sulphate (33% MgO).

Additions are completed with a new nematicide, yellow oxide of mercury dust for the control of eelworms and soil-borne diseases, with an active ingredient of 0.5% HgO, equivalent to 0.47% Hg; and a perforated sprinkling hose.

# Power-Gas Group Busy on Contracts for Chemicals, Gas and Plastics Materials

A LARGE contract for the erection of equipment and fabrication and erection of piping for a chemical process plant in South Wales has been awarded to the General Contracts Division of P.G. Engineering Ltd., according to the May edition of *The Power-Gas Group Review*. Work has started on the project and a machine-equipped workshop has been set up on site for fabrication.

The division has also undertaken an extension to a pipework contract for the U.K. Atomic Energy Authority and the erection of chemical plant, and the design and fabrication and erection of pipework for a factory at Speke.

Among contracts to be handled by the Chemical Plant Division is a contract for a liquid carbon dioxide plant with capacity of 150 lb./hour that is to be installed in Kerala State, India, while a package plant to produce 50 lb./hour of liquid $CO_2$ was recently shipped to the Middle East. Similar plants are now operating in Melbourne, Khartoum, Mombasa and Qatar.

The Gas Plant Division has supplied equipment for the first stage of development at the Lurgi high pressure gasification plant for the Scottish Gas Board at Westfield. An order has now been placed with the division for the second stage. Vessels, including the gasifier and waste heat boiler, will be manufactured by Ashmore, Benson Pease and Co. Ltd.

The division is also busy on a plant to reform natural gas at the Whitby Gas Works of the North Eastern G.B., due for completion by July. Conversion equipment to enable an existing C.W.G. plant to reform light distillate at Beckton for the North Thames G.B.; several of the 18 C.W.G. units under modification to reform light distillate throughout the country have been commissioned during the past few months.

The Works Division of Ashmore, Benson, Pease and Co. is fabricating refinery equipment for Petroleos Mexicanos (Pemex) through Fluor Engineering and Construction Co. The equipment for the Minatitlan refinery includes more than 70 heat exchangers and two vessels each 214 ft. long by 12 ft. in diameter. The Hero reactor vessel for the A.E.A. is to be manufactured, together with a stainless steel diagrid for the reactor. The division also has under construction a number of large polymer mixing vessels for a polyolefins plant now under construction.

Rose, Downs and Thompson Ltd. are working on a high-temperature heating unit which will provide process heat in the production of synthetic resins for a U.K. firm. The unit is being made under licence from Hch. Betrams, Switzerland and will have an output of 2.5 million B.Th.U./hr.

First stage of the work by A.B.P. and Co., Africa, to double synthetic ammonia capacity at Modderfontein for African Explosives and Chemical, has been completed. The gasification section is producing a nitrogen-free gas from Lurgi semi-coke, using an oxygen-steam blast. With this revised system, the nitrogen needed for the synthesis gas is added at a later stage, increasing the capacity of each generator. The new CO conversion, $CO_2$ removal, CO removal and final purification and ammonia synthesis sections are all being brought on line in sequence. Existing gasification and CO conversion sections are now being modified in line with the new units.

# PEOPLE in the news

● **Mr. Arthur Douglas Berk,** chairman of F. W. Berk and Co. Ltd., has relinquished the chairmanship of the company. He is succeeded by **Mr. Claude Hugh Tanner,** who joined the company in 1928, and became deputy chairman in 1959. Mr. Berk, who leaves the post after 18 years in office, will remain on the board until 5 September, when he will have completed 55 years with the company.

● **Mr. Joseph K. Roberts,** who retired recently as a director and vice president of Standard Oil (Indiana), has been elected a director of Scientific Design Co., Inc., New York. Responsible for the chemical activities and research for Standard Oil, Mr. Roberts will study long-range plans for the diversification and expansion of the Scientific Design Group.

● **Mr. T. H. Hopper, Ph.C.,** Middleton and Co. Ltd., was re-elected chairman at the recent annual meeting of the British Laboratory Ware Association. Other members of council were elected as follows: hon. treasurer, **J. G. Malpass, Ph.C.** (W. Finlayson, Stockton-on-Tees), **G. A. Bennie** (McCulloch Bros. and Wilson, Glasgow), **J. Clegg** (James Woolley Sons and Co. Ltd., Manchester), **T. A. Dryden** (T. Dryden Ltd., Landore, Swansea), **K. A. Tozer** (Charles Hearson and Co. Ltd., London S.E.1), and **C. H. Williams** (Jencons (Scientific) Ltd., Hemel Hempstead, Herts).

● **Mr. Bernard F. Howard, J.P., F.R.I.C.,** has resigned from the board of Howards and Sons Ltd., Ilford, and has been elected president of the company. Mr. Howard, who is 80, has been a director for 57 years.

● **Dr. S. F. A. Kettle, B.Sc., Ph.D.,** has been appointed full-time lecturer in chemistry at the University of Sheffield; and **Dr. P. G. Perkins, B.Sc., Ph.D.,** is appointed full-time lecturer in inorganic chemistry.

● **Dr. H. Hollings, O.B.E., D.Sc.,** has been appointed chairman of the board of Nordac Ltd., chemical engineers, a member of the Woodall-Duckham group of companies. **Mr. J. Bishop, M.I.Chem.E.,** has been re-appointed managing director of the reconstituted board. **Mr. A. E. Norman** remains on the board, and **Mr. J. Austin, B.Sc., A.M.I.Chem.E.,** becomes technical director.

● **Dr. Gerald B. Cook,** who has been appointed chief chemist of the International Atomic Energy Agency, Vienna, is an atomic energy pioneer, having been closely associated with chemistry aspects of atomic energy development ever since its initial stages in England 20 years ago. Dr. Cook had been working at the Cavendish Laboratory since 1940, when in 1944 he was transferred to the Canadian atomic energy project in Montreal and at Chalk River. He returned to England in 1947 and worked at the Atomic Energy Research Establishment, Harwell, and in 1954 became head of the chemistry group of the Isotope Research Division, which was then headed by **Dr. Henry Seligman,** the present I.A.E.A. deputy director general in charge of research and isotopes. Dr. Cook will mainly work at the agency's main laboratory, now being constructed at Seibersdorf, near Vienna.

● At the thirteenth annual general meeting of the Fertiliser Society held in Maidstone on 19 May, **Dr. H. L. Richardson** was elected president, and **Dr. G. W. Cooke,** vice-president. **Dr. J. H. Hudson, Mr. A. H. Kaye** and **Mr. J. H. H. Peak** were elected to fill vacancies on Council. Dr. Richardson, Overseas Department, Central Agricultural Control, I.C.I., Ltd., was last year vice-president of the society.

● **Professor E. L. Hirst, C.B.E., F.R.S.,** Professor of Organic Chemistry at Edinburgh University, has been elected an hon. member of the Polish Chemical Society. During World War II he took an active part in the organisation of the training of Poles at Edinburgh University.

● **Dr. W. J. Kroll,** of Corvallis, Oregon, has been appointed the sixth Castner Memorial lecturer and will deliver his lecture, entitled 'The fusion electrolysis of titanium', in Glasgow on Friday, 7 October. Further details will be announced by Society of Chemical Industry.

● Award of an Evans Medal for merit in pharmacy has been made to **Mr. T. D. Whittet, B.Sc., F.P.S., F.R.I.C., D.B.A.,** for the year 1959. He is on the staff of the University College Hospital and Medical School as chief pharmacist and lecturer in pharmacy and has been a recognised teacher at London University since 1953. He has also been a member of the British Pharmacopœia sterile materials committee and is a member of W.H.O. expert committee for the International Pharmacopœia.

● **Professor van der Kerk,** director of the Dutch Government's Institute of Organic Chemistry, and Professor of Chemistry at Utrecht University, left London on 11 May after a three-day visit to the Nutrition Research Unit at Huntingdon, Leicester University and the laboratories of the Tin Research Institute at Greenford.

He has pioneered much of the research work on organotin compounds sponsored by the institute, and his visit to Huntingdon was to enable him to confer with Professor A. Worden of the N.R.U. about research work on the veterinary uses of organotin compounds.

● **Mr. G. S. Bache,** joint managing director, Reichhold Chemicals Ltd., Liverpool, was re-elected president at the annual meeting on Tuesday of the British Chemical and Dyestuffs Traders' Association. Other officers elected were: vice-presidents, **C. W. Lovegrove** and **H. Gilliat, M.C.;** chairman, **Denis F. Waugh** (Tar Residuals Ltd.); vice-chairman, **Dr. C. J. Bell;** hon. treasurer, **Kingsley Williams;** council, **D. A. Gates** (Bush, Beach and Segner Bayley Ltd.); **G. H. Owtram** (Charles Page and Co. Ltd.); **H. R. Peters** (J. M. Steel and Co. Ltd.); **Fred Weil** (Joseph Weil and Son Ltd.); **C. H. Wilson** (Cole and Wilson Ltd.) hon. auditor, **A. R. Sparrow.**

● **Mr. Oscar McKernan,** chairman of Enfield Chemical Ltd., Accrington, retired recently after 23 years' service with the firm. The staff presented him with a cigarette case. Mr. McKernan helped to found the firm in 1937, when there were only seven employees. There are now 60 employees and the firm has branches in Bradford and London.

● **Mr. R. A. Hamilton,** development director of I.C.I. Billingham Division, and chairman of Central Agricultural Control, I.C.I. Ltd., London, has resigned from the board of Scottish Agricultural Industries owing to the pressure of other duties.

● **Dr. J. H. Hamence, Ph.D., M.Sc., F.R.I.C.,** of Dr. Bernard Dyer and Partners, was elected president of the Association of Public Analysts in succession to **Mr. J. G. Sherratt** at the annual meeting held at Chester on 14 May. He is a past-president of the Society for Analytical Chemistry. Other officers elected were: vice-president, **D. D. Moir** (16 Southwark Street, London S.E.1), past-presidents (serving on council), **H. E. Monk** and **J. G. Sherratt;** hon. treasurer, **R. C. Spalding;** hon. editor, **Dr. E. C. Wood** (Lincolne Sutton and Wood); hon. secretary, **F. A. Lyne** (Thomas McLachlan and Partners); assistant hon. secretary, **D. F. H. Button** (Municipal Offices, London S.E.17).

● **Mr. W. W. Metcalfe** has been appointed a director of Howards and Sons. He is chairman and president of the company's Canadian subsidiary, Howards and Sons (Canada).

● **Mr. Herbert W. Vallender,** of the Association of British Chemical Manufacturers, returned on 14 May from a three-week visit to Canada and the U.S. While in Canada he gave evidence on behalf of A.B.C.M. at the Canadian Tariff Board enquiry on chemicals.

● **Sir Charles Key** and **Mr. Harold T. Collinswood** have been appointed additional directors of the Pulsometer Engineering Co. Sir Charles was until recently Deputy Under-Secretary of State at the War Office; Mr. Collinswood is an executive director of Foster Wheeler.

Overseas News

# JAPAN'S INVESTMENTS IN CHEMICALS MAY REACH $900 M. THIS YEAR

A TOTAL of some U.S.$900 million or more is to be invested in the Japanese chemical industry in 1960, after an average for the past five years of about U.S.$250 million annually. This is part of the expansion programme foreseen by the development plans backed by the Japanese Government to raise chemical output by as much as 89% between the fiscal years 1956 and 1962. Development is to take place in all sectors of the industry.

Already Japan is one of the world's leading producers of such items as sulphuric acid, chemical fertilisers, synthetic fibres and dyestuffs, and it is now building up rapidly its production of pharmaceuticals and vitamins. The foundation of a strong petrochemical industry has been laid, and for about a year now synthetic rubber has been produced in Japan.

Last year, Japanese chemical exports were worth some U.S.$166,590,000 as against U.S.$137,780,000 in 1958, though the share of chemicals in total exports remained at the pre-war level of about 5%. Limited stocks of raw materials have prevented any more dynamic development than that previously realised.

## Pakistan Increases Chemicals Production

Total investment in the West Pakistan chemical industry now stands at Rs26.29 million, comprising six factories of various types. Main items of production are chlorine, caustic soda, sulphuric acid, superphosphates, sulphur black, rosin and turpentine.

Salt production in East Pakistan is the subject of a new and ambitious scheme drawn up by the Government, wherein, at an estimated expenditure of Rs640,000, it is aimed to achieve self-sufficiency in salt during the second five-year plan.

## Prince Bernhard to Open Pernis Synthetic Rubber Plant

The new synthetic rubber plant at Shell's Pernis Refinery, near Rotterdam, will be opened on 24 June by the Prince of the Netherlands. The new plant will manufacture SBR synthetic rubber and has a capacity of 60,000 tons a year. It will be able to cover the requirements of the Benelux countries for SBR and to export large quantities to other countries.

## General Aniline Expansion in Acetylene Field

The Calvert City, Kentucky, plant of the General Aniline and Film Corporation is to extend its facilities to take up production of acetylene chemicals. These have been hitherto produced exclusively at the Corporation's Linden, New Jersey, works. The expansion will be carried out as part of a five-year plan based on estimated consumption in the period ending 1965. The Ministry of Justice of the U.S. has in the meantime lodged a special appeal with the Washington Court of Appeal aimed at the rehearing of the Interhandel-General Aniline case (see CHEMICAL AGE, 7 May).

## Phenolic Resin Modifier for Polyvinyl Acetate

Poly-Phen L-118, a new phenol formaldehyde resin designed to modify the properties of polyvinyl acetate, has been introduced by National Polychemicals, Inc., Wilmington, Mass. The resin highly reactive and water-soluble, improves the resistance of polyvinyl acetate to high temperature, water and a variety of solvents. It also reinforces the physical properties of the polymer.

Poly-Phen L-118 is believed to cross-link with polyvinyl acetate and to some extent impart thermosetting characteristics to the polymer. Compatible to a high degree with polyvinyl acetate emulsions, L-118 is recommended in the range of 2 to 20% (based on the solids content).

## French Consortium

The French chemical industry has formed a financial consortium for the financing of investment schemes through capital market loans. The group bears the name of Groupement de l'Industrie Chimique de Synthèse and has as members such firms as Saint-Gobain, Kuhlmann, Nobel-Bozel, Péchiney, Progil, Produits Azotés and Rhône-Poulenc.

## U.A.R. Plan £E25 Million Petrochemical Plants

Plants for the production of propane gas, sulphur, petroleum coke, diesel oil and kerosene are to be built in the United Arab Republic. The installations will cost some £E25 million and will save about £E12.8 million in imports annually (see also CHEMICAL AGE, 14 May, p. 798).

## West German Chemical Industry Fears Trade Split

The setting-up of a tariff trench between the Common Market and the free trade area could endanger some 27% of the exports of the West German chemical industry—the £125 million worth sold to Outer Seven countries—states the Association of the Bavarian Chemical Industry in its 1959-60 report. The regional chemical industry of Bavaria depended to as much as 50% on sales to E.F.T.A., particularly to Switzerland and Austria, and would therefore be badly hit. Over the year under report the turnover of the Bavarian chemical industry rose by 14% and its exports by 18%, these figures arising mainly from the area's growing chemical fibre industry.

## Israeli Fertiliser Plant for Burma

A plant for the production of sulphuric acid and superphospates is to be built near the Burmese capital of Rangoon by the Israeli concern Fertilizers and Chemicals Ltd., Haifa. The start of work on the project depends on the final signing of a contract by the Burmese Government. Erection of the plant will take two years, equipment to come partly from Fertilizers and Chemicals and partly from other countries. Majority shareholder in the £125 million Fertilizers and Chemicals concern, at present seeking further foreign credit to expand at home, is the Israeli Government.

## Carbon Black Production Starts at Amsterdam

The carbon black plant of the Amsterdam firm of Ketjen-Carbon N.V., has been brought into operation at Botlek near Rotterdam. The operating company, which erected the plant within one year, is a joint subsidiary of the Koninklijke Zwavelzuurfabrieken v/h Ketjen N.V., Amsterdam, and Godfrey L. Cabot Inc., Boston, Mass., who hold, respectively 60% and 40% of the shares. Initial capacity of the Botlek plant is 24,000 tonnes/year, over half of which is destined for export.

## Spain Considers Four Plans for Petrochemicals Plant

The Spanish Government will shortly consider four proposals for the erection of petrochemicals plant. These are by Union Quimica del Norte in conjunction with Dow Chemical; Compania Española de Petroleos in conjunction with Esso; Union Española de Explosivos in conjunction with Royal Dutch-Shell; and the State-sponsored National Institute of Industry, the largest of the projects involving a refinery as well as a petrochemicals plant involving plants at Puertollano, about 150 miles north of Malaga, with which port they would be connected by pipeline.

## Common Market Aid for Italian Sulphur Industry

The Common Market organisation is to place a sum of Lire 40,000 million at the disposal of the Italian sulphur industry for the modernisation of production and marketing. The payment will be effected through the six-country European Investment Bank. A committee of sulphur experts is to be formed following a decision by the ministerial council of the Common Market executive to plan the form which the basic assistance programme will take.

## Pakistan Plans for Chemicals From Natural Gas

The West German group of experts who have been studying the question of raw materials and economic concentration in Pakistan have advised the erection of certain plants for the processing of indigenous natural gas. These include plants

for the production of acetylene, synthetic fertilisers, synthetic fibres and other chemical products. German chemical concerns are to take part in any execution of this development scheme.

## Rexspar Plan Fluorspar and Acid Plants in Canada

Rexspar Minerals and Chemicals Ltd. have engaged Western-Knapp Engineering Co., San Francisco, to prepare a preliminary report on the engineering aspects of bringing their fluorspar property near Kamloops, B.C., into production. Plant construction will proceed when the report is complete.

It is intended to establish hydrofluoric acid and sulphuric acid plants when the fluorspar deposit has been fully developed. Metallurgists have changed their estimate of average grade of fluorspar to 35% from the previous estimate of 29½%.

## Albatros Opens Fertiliser Plant at Pernis

A new fertiliser plant was opened at Pernis, Rotterdam, last week by Albatros Superfosfaatfabrieken. The process by which the fertiliser will be produced has been developed by the Dutch company's own laboratories in co-operation with the Tennessee Valley Authority, U.S.

## B.P. Company Complete Refinery in Canada

Expected to go on stream within the next few weeks is the Ville d'Anjou (Montreal) refinery of the British Petroleum Co. Ltd., the company's first on the continent of North America.

The refinery was designed to produce high octane motor fuel, together with kerosine, diesel oil, furnace oils and heavy fuel oil. Liquefied petroleum gas will also be produced and refinery waste gases sold for the production of petrochemicals.

## Scandium Now Produced in Canada

Scientists working for Rio Tinto Dow in Canada have produced small quantities of scandium in the process of extracting thorium from the waste liquors of the Ontario uranium mines.

The metal, still only a laboratory production, is sold by a U.S. company which handles the processing, and is used for experimental work.

Scandium is No. 21 on the atomic scale, has an atomic weight of 45.10, specific gravity of 2.48 and a melting point of 1,350°C.

## $10 Million Fertiliser Project for El Salvador

A group of Central American investors, with the participation of U.S. and German interests, has recently formed a company in El Salvador called Fertilizantes de Centro America S.A. (Fertica) which is planning to build a $10 million fertiliser plant in Acajutla, El Salvador. The main unit will be a plant for production of nitrogenous, phosphorus and potassium fertilisers with a capacity of 400 tons/day. The works are to comprise in addition a nitric acid plant with a daily output of 250 tons, and an ammonium nitrate plant with a daily capacity of 150 tons. There are at present no local raw materials available but it is hoped to obtain these from Latin American countries.

## Chile Closing Nitrate Mine

The Chilean authorities have permitted the closure of the Nebraska mine of the Cia. Salitrera de K Tarapaca y Antofagasta which has been working at a loss for some time. Official permission to close had been withheld until new employment could be found for the workers.

## Brazil to Exploit Nickel Deposits

A new Brazilian company, Soc. Morro do Niquel, has been established under the auspices of the Bank of Indo-China to exploit and process nickel deposits in the State of Minas Gerais.

## Pharmaceuticals Reference Published in the U.S.

A reference of ethical new-pharmaceuticals, Pharmindex, P.O. Box 1029, Federal Station, Portland, Oregon, is being published in periodical form to provide completely up-to-date information to professional workers who are concerned with the newest pharmaceutical products. Each monthly issue provides complete data on all ethical pharmaceuticals marketed that month in the U.S.

## U.S.A.F. Studies Chemistry of Boron and other Hydrides

In a report on 'The chemistry of boron and related hydrides', R. W. Parry and others (University of Michigan for Wright Air Development Centre, U.S. Air Force) report that a microcrystalline form of $B_2H_6.2NH_3$ was obtained and the powder pattern tabulated for ready compound identification. Improved methods were developed for the synthesis of pure salts of the form $[H_2B(NH_3)_2]X$. A complete single-crystal X-ray crystallographic study establishing the structure of $[H_2B(NH_3)_2]Cl$ was finished and the data confirmed other structure assignments in every detail. Structures of the bromide and iodide salts were also deduced.

The 'diammoniate of diborane', $[H_2B(NH_3)_2]BH_4$, was prepared by metathesis, which offers complete chemical support for structures previously derived. A strong similarity was found between the chemistry of diborane and tetraborane. Two new compounds, $B_4H_{10}.2NH_3$ and $H_3NH_2H_7$, were prepared. A detailed Raman spectral study of $B_2H_6$ was completed and also described is a spectroscopic study of several borohydrides along with force constant calculations.

The report, PB 161080, is from the office of Technical Services, U.S. Department of Commerce, Washington, D.C., price $3.25.

## U.S. Foam Producers to Build Isocyanate Plant

Nopco Chemical, makers of flexible and rigid foams, are planning to build an isocyanate plant, intended mainly for the production of tolylene diisocyanate used in urethane foams. Bechtel will design and construct the plant. Nopco are the first U.S. urethane foam producers to make their own basic materials, and the firm estimate that by the time the plant is complete, in January 1962, their sale of foam will be sufficient to absorb the major part of their 10 million lb./year output.

# New Olin-Mathieson Plant Said to be World's Largest High-analysis Fertiliser Plant

THE newly constructed section of the Olin Mathieson 'high-analysis' fertiliser plant at Pasadena, Texas, formally opened on 11 May, gives the plant a capacity of more than a ton a minute of pelletised ammonium phosphate fertiliser, representing a 40% increase over former output.

The plant's location on the Houston ship channel makes it possible for economical distribution to the midwest farming regions via Mississippi, Missouri and Ohio river barges, and to both coasts by rail and water. Phosphate rock arrives via the Gulf of Mexico from the Tampa area in Florida; liquid sulphur comes in tankers from Texas; ammonia from the corporation's nearby Lake Charles, La., plant, and potash from New Mexico.

With the new addition Olin Mathieson are adding new grades to their Ammo-Phos line. Among them are 15-15-15, 16-48-0, 14-28-14, 7-28-28, 9-36-18, 13-39-13, and 12-24-24 of N, $P_2O_5$ and $K_2O$ respectively. These grades are developed for a wide variety of crop and soil conditions, the code or formula figures representing percentages of nitrogen, phosphate and potash, in that order.

Phosphate rock from Florida is ground with steel balls and stored. From storage it is sent to a reactor where it is mixed with sulphuric acid from an adjacent plant, making phosphoric acid and waste gypsum.

Phosphoric acid is then reacted with ammonia from the corporation's Lake Charles, La., plant. The mixture goes to a blunger where ammonium phosphate pellets are formed, and at which point potash is added, if required. From there the pellets are dried and then screened, with the oversized and undersized pellets returning to the blunger for reforming. Pellets are then stored and screened once more before bagging.

Since 1950 Olin Mathieson have produced over 3,500,000 tons of the fertiliser, and the added production facility gives the Pasadena plant a capacity in excess of half a million tons/year.

## Commercial News

# • Borax 6-months Profit up £260,000
# • Beecham's Record 1959 Profit and Sales
# • Lacq Competition and Tharsis Sulphur
# • Large-scale Expansion by Reichhold

### A.P.V. Co.

Group net profit of the A.P.V. Co. Ltd., designers and manufacturers of process plant, stainless steel equipment, etc., for 1959, was £257,960 (£159,177), while the dividend was raised from 3½% to 8½%.

The current year's trading has started well, according to a report from the chairman, Mr. W. E. Jenkins, and the board anticipates another satisfactory year's trading in 1960.

### Borax (Holdings)

Group net profits of Borax (Holdings) for the six months ended 31 March have reached £1,346,619 from £1,087,231 for the same period of the previous year. Sales of all the products of the group have been well maintained.

### Coalite and Chemical Products

Coalite and Chemical Products are raising their dividend for the year ended 31 March to 16½% from 13% for 1958-59, and are proposing a one-for-two scrip issue. Final payment is raised by one and a half points to 11½%. Profits for the current year are expected to permit a total distribution of not less than 11% to be paid on the increased capital. Group net profits rose to £500,997 from £380,335.

### Beecham Group

Net profits of the Beecham Group of profit for 1959 amounted to £803,758 companies for 1959 are £594,000 higher, at £3,790,000; while the dividend has been raised from 24% to 27%, and sales have risen by £9 million to almost £50 million, all of which constitute new records.

Again the half year's figures have proved to be good.

### Horace Cory

Trading profit for 1959 of Horace Cory and Co. Ltd. was £41,451 (£31,305). Profit after charging tax of £19,647 (£17,857) was £23,692 (£14,097). Ordinary dividend totals 25%, plus 5% bonus (22½%, bonus nil). £6,250 from general reserve is to be capitalised by the issue of a further 125,000 full paid ordinary shares.

Mr. D. S. Glover, chairman, in his annual report says that future prospects are clouded by the recent repeal of the Dyestuffs Act following formation of the E.F.T.A. Full effects of these changes were yet to be realised but they had litle merit for the industry as a whole and the likely benefits to the company were negligible. Results for the first three months of 1960 compared favourably with 1959.

### Tharsis Sulphur

While the moderate increase in demand for pyrites noted last year continued, the Tharsis Sulphur and Copper Co. Ltd. could not expect a rapid increase of sales in their market of Northern Europe and Spain commensurate to their potential capacity as now established. This was stated by Mr. W. P. Rutherford, chairman, at the annual meeting on 19 May.

Referring to the new natural gas industry at Lacq, Mr. Rutherford said that increasing quantities of sulphur were produced to invade markets that were already supplied by U.S. and Mexican producers with elemental sulphur. With each producer endeavouring to retain its established position and Lacq determined to place an increasing production of by-product sulphur, the result was inevitable and pyrites as a sulphur ore could not escape from the repercussions.

Mr. Rutherford agreed with those who believed in the progressive expansion in demand for sulphur, including pyrites, based on the rising world population and the universal desire for higher standards of living, which affected agriculture and industry generally, both users of sulphur.

### Reichhold Chemicals

Profit margins were again satisfactory and the substantial expansion of sales had enabled directors of Reichhold Chemicals Ltd. to present a result showing continued progress, states Mr. Walter H. Breuer, chairman, in his annual statement.

The phthalic anhydride plant extension started working in December and provided a welcome addition to supplies, particularly in view of the prevailing world-wide shortage with consequent substantial price increases. In spite of that higher production, Beck Koller had had to buy phthalic to take care of their ever-growing need.

To meet calls for polyester resins, it was essential to plan a substantial increase in resin production. Additional productivity of resins was imperative in other fields and new plant was to be installed and should be on stream by December 1960. That would have the effect of doubling resin output at Speke, with an expected cut in overheads. A new constructional resin department had been completed and would contribute to the increasing diversification in the industrial fields based on new materials.

To meet the substantial increased demand for p.v.c. compounds, etc., a new plant for Vinatex was being built at Havant. New plant was being installed and from the end of July should meet higher demand for Vinatex products. Vinyl Products were developing and marketing a number of new products that would call for a substantial increase of productive capacity over the next few years.

### Permutit Co.

Net trading profit for 1959 of the Permutit Co. Ltd., water treatment engineers, was £187,190 (£168,968), while the dividend is 20% (15%). The chairman reports that steady progress is being maintained.

### Matthew Hall

Profit after taxation of the Matthew Hall and Co. Ltd. group for 1959 was £252,231 (£201,152), and the directors have recommended a dividend of 27½% (1958 equivalent, 15%). The annual general meeting of the company will be held in London on 10 June.

Mentioned in the directors' report and

(*Continued on p. 890*)

## *Market Reports*

# ACTIVE CALL FOR AGRICULTURAL CHEMICALS

**LONDON** Trading conditions on the industrial chemicals market have shown little change on the week, and the movement on home account against contracts has been fully maintained. The flow of export inquiry continues satisfactory. Agricultural chemicals are a fairly active market, but the seasonal demand for fertilisers is easing. Prices generally for industrial chemicals are steady.

Demand for the coal tar products is keeping up well with the pyridines and refined tar in fair request.

**MANCHESTER** The past week has seen little sign of easing off in the demand for chemical products on the Manchester market, though the usual seasonal setback is expected shortly as the annual holiday stoppages at the consuming end get into full swing. Both home and shipping business in most sections of the market has been maintained at a satisfactory level and a fair number of additional inquiries have been circulating. There has been little change in the general price position.

**SCOTLAND** The past week has again shown little change generally in the Scottish heavy chemical market. Buying has been brisk and on the whole quite a varied cross-section of industry was included with particular interest being shown in chemicals for the paper trade. Quantities too have been well maintained both in regard to immediate and forward requirements. Continued activity is still being shown in agricultural chemicals.

# BRITISH CHEMICAL PRICES

## GENERAL CHEMICALS

**Acetic Acid.** D/d in ret. barrels (tech. acid barrels free); in glass carboys, £8; demijohns, £12 extra. 80% tech., 10 tons, £97; 80% pure, 10 tons, £103; commercial glacial, 10 tons, £106.

**Acetic Anhydride.** Ton lots d/d, £128.

**Alum.** Ground, f.o.r., about £25.
MANCHESTER: Ground, £25.

**Aluminium Sulphate.** Ex-works, d/d, £15 10s to £18.
MANCHESTER: £16 to £18.

**Ammonia, Anhydrous.** Per lb., 1s 9d-2s 3d.

**Ammonium Chloride.** Per ton lot, in non-ret. pack, £33 2s 6d.

**Ammonium Nitrate.** D/d, 4-ton lots, £37 10s.

**Ammonium Persulphate.** Per cwt., in 1-cwt. lots, d/d, £6 13s 6d; per ton, in min. 1-ton lots, d/d, £123 10s.

**Ammonium Phosphate.** MAP., £106 per ton; DAP, £100 10s., per ton, d/d.

**Antimony Sulphide.** Per lb., d/d UK in min. 1-ton lots; crimson, 5s d/d to 5s 5½d; golden, 3s 3½d d/d per lb. to 4s 8½d d/d.

**Arsenic.** Ex-store, £45 to £50.

**Barium Carbonate.** Precip., d/d, 5-ton lots or more, bag packing, £41 per ton.

**Barium Chloride.** 2-ton lots, £45.

**Barium Sulphate [Dry Blanc Fixe].** Precip. 2-ton lots, d/d, £39.

**Bleaching Powder.** Ret. casks, c.p. station, in 4-ton lots. £30 7s 6d.

**Borax.** Ton lots, in hessian sacks, c.p. Tech. anhydrous, £70; gran., £47; crystal, £50 10s; powder, £51 10s; extra fine powder, £52 10s; BP, gran., £56; crystal, £59 10s; powder, £60 10s; extra fine powder, £61 10s. Most grades in 6-ply paper bags, £1 less.

**Boric Acid.** Ton lots, in hessian sacks, c.p. Comm., gran., £78; crystal, £87; powder, £84 10s; extra fine powder, £86 10s; BP gran., £91; crystal, £99; powder, £96 10s; extra fine powder, £98 10s. Most grades in 6-ply paper bags, £1 less.

**Calcium Chloride.** Ton lots, in non-ret. pack; solid and flake, about £15.

**Chlorine, Liquid.** In ret. 16-17 cwt. drums d/d in 3-drum lots, £41.

**Chromic Acid.** Less 2½%, d/d UK, in 1-ton lots, per lb., 2s 2¾d.

**Chromium Sulphate, Basic.** Crystals, d/d, per lb., 8¼d; per ton, £79 6s 8d.

**Citric Acid.** In kegs, 1-4 cwt. lots, per cwt., £11; 5-19 cwt. lots, per cwt., £10 16s; 1 ton lots, per cwt, £10 15s; packed in paper bags, 1-4 cwt. lots, per cwt., £10 12s; 5-19 cwt. lots, per cwt., £10 8s; 1 ton lots, per cwt., £10 7s.

**Cobalt Oxide.** Black, per lb., d/d, bulk quantities, 13s 2d.

**Copper Carbonate.** Per lb., 2s 1d.

**Copper Sulphate.** £85 per ton less 2% f.o.b. Liverpool.

**Cream of Tartar.** 100%, per cwt., about £11 12s.

**Formaldehyde.** In casks, d/d, £40.

**Formic Acid.** 85%, in 4-ton lots, c.p., £91.

**Glycerine.** Chem. pure, double distilled 1.2627 s.g., per cwt., in 5-cwt. drums for annual purchases of over 5-ton lots and under 25 tons, £12 1s 6d. Refined technical grade industrial, 5s per cwt. less than chem. pure.

**Hydrochloric Acid.** Spot, per carboy, d/d (according to purity, strength and locality), about 12s.

**Hydrofluoric Acid.** 60%, per lb., about 1s 2d.

**Hydrogen Peroxide.** Carboys extra and ret. 27.5% wt., £115; 35% wt., d/d, £138.

**Iodine.** Resublimed BP, under 1 cwt., per lb., 11s; for 1-cwt. lots, per lb., 10s 6d.

**These prices are checked with the manufacturers, but in many cases there are variations according to quality, quantity, place of delivery, etc.**
**Abbreviations: d/d, delivered; c.p., carriage paid; ret., returnable; non-ret. pack., non-returnable packaging; tech., technical; comm., commercial; gran., granular.**

***All prices per ton unless otherwise stated***

**Iodoform.** Under 1 cwt., per lb., £1 2s 4d for 1-cwt. lots, per lb., £1 1s 8d, 5 cwt., per lb., 21s 1d, crystals, 3s more.

**Lactic Acid.** C.P., 44% by wt., per lb., 14d; 50% by wt., 15¾d; 80% by wt., 25½d; dark tech., 44% by wt., per lb., 9d; 1-ton lots, ex-works, usual container terms.

**Lead Acetate.** White, about £154.

**Lead Nitrate.** 1-ton lots, about £135.

**Lead, Red.** Basic prices: 15-cwt. drum lots, Genuine dry red, £110 15s per ton; orange lead, £122 15s per ton; Ground in oil: red, £131, orange, £143.

**Lead, White,** Basic prices: in 5-cwt. drums, per ton for 2 ton lots, Dry English £122; Ground in oil, £141.

**Lime Acetate.** Brown, ton lots, d/d, £40; grey, 80-82%, ton lots, d/d, £45.

**Litharge.** In 5-cwt. drum lots, £122 15s per ton.

**Magnesite.** Calcined, in bags, ex-works, about £21.

**Magnesium Carbonate.** Light, comm., d/d, 2-ton lots, £84 10s under 2 tons, £97.

**Magnesium Chloride.** Solid (ex-wharf), £17 10s.

**Magnesium Oxide.** Light, comm., d/d, under 1-ton lots, £245.

**Magnesium Sulphate.** Crystals, £16.

**Mercuric Chloride.** Tech. powder, per lb., for 1-ton lots, £1 0s 3d; 5-cwt. lots, in 28-lb. parcels, £1 0s 9d; 1-cwt. lots, £1 1s.

**Mercury Sulphide, Red.** 5-cwt. lots in 28-lb. parcels, per lb., £1 10s 6d; 1-cwt. lots, £1 11s.

**Nickel Sulphate.** D/d, buyers UK, nominal, £170.

**Nitric Acid.** 80° Tw., £35 2s.

**Oxalic Acid.** Home manufacture, min. 4-ton lots, in 56 lb. paper bags, c.p., about £130.

**Phosphoric Acid.** TPA 1,700, ton lots, c.p., £103; BP (s.g. 1.750), ton lots, c.p., per lb., 1s 4d.

**Potash, Caustic.** Solid, 1-ton lots, £95 10s; liquid, £36 15s.

**Potassium Carbonate.** Calcined, 96/98%, 1-ton lots, ex-store, about £76.

**Potassium Chloride.** Industrial, 96%, 1-ton lots, about £24.

**Potassium Dichromate.** Gran., per lb., in 5-cwt. to 1-ton lots, d/d UK, 1s 2¼d.

**Potassium Iodide.** BP, under 1-cwt., per lb., 7s 2d; per lb. for 1-cwt. lots, 6s 11d.

**Potassium Nitrate.** 4-ton lots, in non-ret. pack, c.p., £63 10s.

**Potassium Permanganate.** BP, 1-cwt. lots, per lb., 1s 11¾d; 3-cwt. lots, per lb., 1s 11¼d; 5-cwt. lots, per lb., 1s 10¾d; 1-ton lots, per lb., 1s 10¼d; 5-ton lots, per lb., 1s 10d. Tech., 1-ton lots in 1-cwt. drums, per cwt., £9 18s; 5-cwt. in 1-cwt. drums, per cwt., £10; 1-cwt. lots, £10 9s.

**Salammoniac.** Ton lot, in non-ret. pack, £47 10s.

**Salicylic Acid.** MANCHESTER: Tech., d/d, per lb., 2s 6d, cwt. lots.

**Soda Ash.** 58% ex-depot or d/d, London station, 1-ton lots, about £16 11s 6d.

**Sodium Acetate.** Comm. crystals, d/d, £75 8s.

**Soda, Caustic.** Solid 76/77%; spot, d/d 1-ton lots, £33 16s 6d.

**Sodium Bicarbonate.** Ton lot, in non-ret. pack, £12 10s.

**Sodium Bisulphite.** Powder, 60/62%, d/d 2-ton lots for home trade, £46 2s 6d.

**Sodium Carbonate Monohydrate.** Ton lot, in non-ret. pack, c.p., £64.

**Sodium Chlorate.** 1-cwt. drums, c.p. station, in 4-ton lots, about £75 per ton.

**Sodium Cyanide.** 96/98%, ton lot in 1-cwt. drums, £126.

**Sodium Dichromate.** Gran. Crystals per lb., 1s. Net d/d UK, anhydrous, per lb., 1s 1¾d. Net del. d/d UK, 5-cwt. to 1-ton lots.

**Sodium Fluoride.** D/d, 1-ton lots and over, per cwt., £5; 1-cwt. lots, per cwt., £5 10s.

**Sodium Hyposulphite.** Pea crystals, £38; comm., 1-ton lots, c.p., £34 15s.

**Sodium Iodide.** BP, under 56 lb. per lb., 10s; 56 lb. and over, 9s 9d.

**Sodium Metaphosphate [Calgon].** Flaked, paper sacks, £136.

**Sodium Metasilicate.** (Spot prices) D/d UK in 1-ton lots, 1-cwt. free paper bags, £29.

**Sodium Nitrate.** Chilean refined gran. over 98%, 6-ton lots, d/d c.p., per ton, £29.

**Sodium Nitrite.** 4-ton lots, £32.

**Sodium Perborate.** (10% available oxygen) in 1-cwt. free kegs, 1-ton lots, £129 10s; in 1-cwt. lots, £139 5s.

**Sodium Percarbonate.** 12½% available oxygen, in 1-cwt. kegs, £170 15s.

**Sodium Phosphate.** D/d, ton lots: di-sodium, crystalline, £40 10s, anhydrous, £89; tri-sodium, crystalline, £39 10s, anhydrous, £87.

**Sodium Silicate.** (Spot prices) 75-84° Tw. Lancs and Ches., 6-ton lots, d/d station in loaned drums, £12 10s; Dorset, Somerset and Devon, per ton extra, £3 5s; Scotland and S. Wales, extra, £2 17s 6d. Elsewhere in England, not Cornwall, extra, £1.

**Sodium Sulphate [Desiccated Glauber's Salt].** D/d in bags, about £19.

**Sodium Sulphate [Glauber's Salt].** D/d, up to £14.

**Sodium Sulphate [Salt Cake].** Unground, d/d station in bulk, £10.
MANCHESTER: d/d station, £10 10s.

**Sodium Sulphide.** Solid, 60/62%, spot, d/d, in drums in 1-ton lots, £36 2s 6d; broken, d/d, in drums in 1-ton lots, £37 2s 6d.

**Sodium Sulphite.** Anhydrous, £71 10s; comm., d/d station in bags, £27-£28 10s.

**Sulphur.** 4 tons or more, ground, according to fineness, £20-£22.

**Sulphuric Acid.** Net, naked at works, 168° Tw. according to quality, £9 15s. per ton. £11 7s 6d; 140° Tw., arsenic free, £8 2s 6d; 140° Tw., arsenious, £7 17s 6d.

**Tartaric Acid.** Per cwt.: 10 cwt. or more, in kegs, 300s; in bags, 292s per cwt.

**Titanium Oxide.** Standard grade comm., rutile structure, £178; standard grade comm., anatase structure, £163.

**Zinc Oxide.** Per ton: white seal, £110; green seal, £108; red seal, £105.

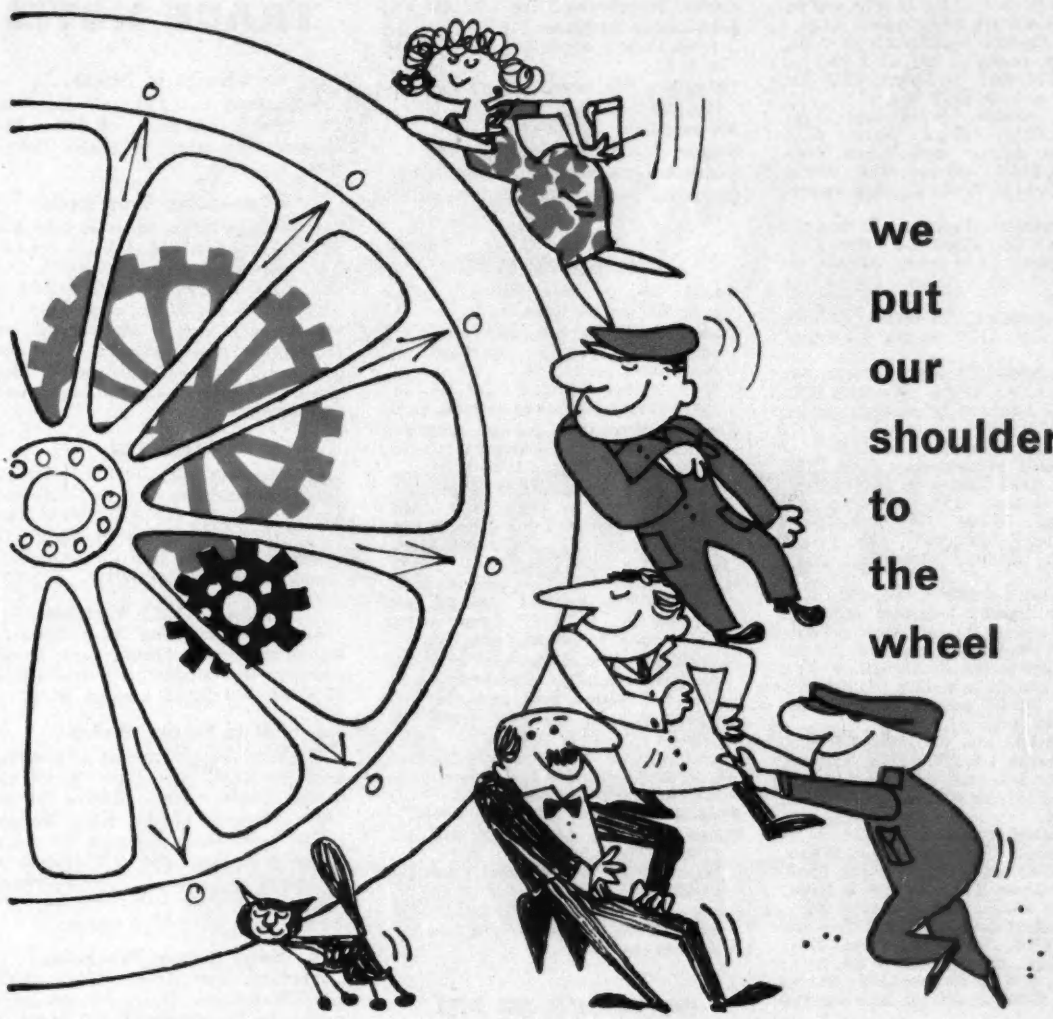
## SOLVENTS AND PLASTICISERS

**Acetone.** All d/d. In 5-gal. drums, £128; in 10-gal. drums, £118; in 40-45 gal. drums, under 1 ton, £93; 1-5 tons, £90; 5-10 tons, £89; 10 tons and up, £88; in 400-gal. tank wagons, £85.

**Butyl Acetate BSS.** 10-ton lots, £165.

***n*-Butyl Alcohol BSS.** 10 tons, in drums, d/d, £137 10s.

***sec*-Butyl Alcohol.** All d/d. In 5-gal. drums, £168; in 10-gal. drums, £158; in 40-45 gal. drums, under 1 ton, £133; 1-5 tons



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SOLVENTS, PLASTICISERS & INTERMEDIATES

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Bisol Sales Office, Devonshire House, Piccadilly, London W.1 MAYfair 8867

TA/2538

£130; 5-10 tons, £129; 10 tons and up, £128; in 400-gal. tank wagons, £125.

***tert*-Butyl Alcohol.** 5-gal. drums, £195 10s; 40/45-gal. drums: 1 ton, £175 10s; 1-5 tons, £174 10s; 5-10 tons, £173 10s; 10 tons and up, £172 10s.

**Diacetone Alcohol.** Small lots: 5-gal. drums, £185; 10-gal. drums, £175. 40/45-gal. drums: under 1 ton, £148; 1-5 tons, £147; 5-10 tons, £146; 10 tons and over, £145, in 400-gal. tank wagons, £142.

**Dibutyl Phthalate.** In drums, 10 tons, d/d per ton, £203; 45-gal. 1-4 drums, £209.

**Diethyl Phthalate.** In drums, 10 tons, per ton, £187 10s; 45-gal. 1-4 drums, £193 10s.

**Dimethyl Phthalate.** In drums, 10 tons, per ton, d/d, £179; 45-gal. 1-4 drums, £185.

**Dioctyl Phthalate.** In drums, 10 tons, d/d, per ton, £276; 45-gal. 1-4 drums, £282.

**Ether BSS.** 1-ton lots, drums extra, per lb., 1s 11d.

**Ethyl Acetate.** 10-ton lots, d/d, £137.

**Ethyl Alcohol Fermentation grade (PBF 66 o.p.).** Over 300,000 p. gal., 3s 10½d; d/d in tankers, 2,500- 10,000 p. gal. per p. gal., 4s 0½d. D/d in 40/45-gal. drums, p.p.g. extra, 2d.
Absolute alcohol (74.5 o.p.), p.p.g. extra, 2d.

**Methanol.** Pure synthetic, d/d, £40.

**Methylated Spirit.** Industrial 66° o.p.: 500-gal. and up, d/d in tankers, per gal., 5s 7½d; 100-499 gal. in drums, d/d per gal., 6s 0½d-6s 2½d. Pyridinised 66° o.p.: 500 gal. and up, in tankers, d/d, per gal., 5s 11d; 100-499 gal. in drums, d/d, per gal., 6s 4d-6s 6d.

**Methyl Ethyl Ketone.** All d/d. in 40/45-gal. drums, under 1 ton, £143 10s; 1-5 tons, £138 10s; 5-10 tons, £136 10s; 10 tons and up, £143; in 400-gal. tank wagons, £134 10s.

**Methyl *iso*Butyl Carbinol.** All d/d. In 5-gal. drums, £203; in 10-gal. drums, £193; 40-45 gal. drums, less than 1 ton, £168; 1-9 tons, £165; 10 tons and over, £163; in 400-gal. tank wagons, £160.

**Methyl *iso*Butyl Ketone.** All d/d. In 5-gal. drums, £209; in 10-gal. drums, £199; in 40/45-gal. drums, under 1 ton, £174; 1-5 tons, £171; 5-10 tons, £170; 10 tons and up, £169; in 400-gal. tank wagons, £166.

***iso*Propyl Acetate.** 10 tons, d/d, 45-gal. drums £132.

***iso*Propyl Alcohol.** Small lots: 5-gal. drums, £118; 10-gal. drums, £108; 40/45-gal. drums: less than 1 ton, £83; 1-9 tons, £81; 10-50 tons, £80 10s; 50 tons and up, £80.

## RUBBER CHEMICALS

**Carbon Disulphide.** According to quality, £61-£67.

**Carbon Black.** GPF: Ex-store, Swansea. Min. 3-ton lots, one delivery, 7¼d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 7¾d per lb.; ex-store, Manchester, London and Glasgow, 8¼d per lb. HAF: ex-store, Swansea; Min. 3-ton lots, one delivery, 8d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 8¼d per lb. Ex-store Manchester, London and Glasgow, 9d per lb.

**Carbon Tetrachloride.** Ton lots, £83 15s.

**India-Rubber Substitutes.** White, per lb., 1s 4¼d to 1s 7d; dark, d/d, per lb., 1s 0¼d to 1s 4d.

**Lithopone.** 30%, about £57 10s for 5-ton lots.

**Mineral Black.** £7 10s-£10.

**Sulphur Chloride.** British, about £50.

**Vegetable Lamp Black.** 2-ton lots, £64 8s.

**Vermilion.** Pale or deep, 7-lb. lots, per lb., 15s 6d.

## COAL TAR PRODUCTS

**Benzole.** Per gal., min. 200 gal., d/d in bulk, 90's, 5s 3d; pure, 5s 7d.

**Carbolic Acid.** Crystals, min. price, d/d bulk, per lb., 1s 4¼d; 40/50-gal. ret. drums extra, per lb., ¼d.
MANCHESTER: Crystals, d/d, per lb., 1s 4¼d-1s 7d; crude, naked, at works, 8s 5d.

**Creosote.** Home trade, per gal., according to quality, f.o.r. maker's works, 1s-1s 9d.
MANCHESTER: Per gal., 1s 3d-1s 8d.

**Cresylic Acid.** Pale 99/100%, per gal., 12s. D/d UK in bulk: Pale ADF, per imperial gallon f.o.b. UK, 8s; per US gallon, c.i.f. NY, 103.50 cents freight equalised.

**Naphtha.** Solvent, 90/160°, per gal., 5s 3d. heavy, 90/190°, for bulk 1,000-gal. lots, d/d, per gal., 3s 11d. Drums extra; higher prices for smaller lots.

**Naphthalene.** Crude, 4-ton lots, in buyers' bags, nominal, according to m.p.: £22-£30; hot pressed, bulk, ex-works, £40; refined crystals, d/d min. 4-ton lots, £65-£68.

**Pitch.** Medium, soft, home trade, f.o.r. suppliers' works, £10 10s; export trade, f.o.b. suppliers' port, about £12.

**Pyridine.** 90/160, per gal., 16s 6d about.

**Toluol.** Pure, per gal., 5s 9d; 90's, d/d, 2,000 gal. in bulk, per gal., 5s 1d.
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**Xylole.** According to grade, in 1,000-gal. lots, d/d London area in bulk, per gal., 5s 9d-5s 11d.

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***o*-Cresol** 30/31°C. D/d, per lb., 1s.

***p*-Cresol** 34/35°C. 10 cwt. lots d/d, per lb., 5s.

**Dichloraniline.** Per lb., 4s 6d.

**Dinitrobenzene.** 88/99°C., per lb., 2s 1d.

**Dinitrotoluene.** Drums extra. SP 15°C., per lb., 2s 1¼d; SP 26°C., per lb., 1s 5d; SP 33°C., per lb., 1s 2½d; SP 66/68°C., per lb., 2s 1d.

***p*-Nitraniline.** Per lb., 5s 1d.

**Nitrobenzene.** Spot, 90 gal. drums (drums extra), 1-ton lots, d/d, per lb., 10d.

**Nitroanphthalene.** Per lb., 2s 5½d.

***o*-Toluidine.** 8-10 cwt. drums (drums extra), per lb., 1s 11d.

***p*-Toluidine.** In casks, per lb., 6s 1d.

**Dimethylaniline.** Drums extra, c.p., per lb., 3s 2d.

# TRADE NOTES

### Change of Name

Wallerstein Co. Ltd., 63 St. Paul's Churchyard, London E.C.4, have changed their name to Baxter Laboratories Ltd.

### Fast-curing Urea Resin

A new fast-curing etherified urea resin is available from British Resin Products Ltd., Devonshire House, Piccadilly, London W.1. The resin, Epok U.9040, is supplied as a solution in butanol and when used in stoving enamels will give films which "possess excellent gloss retention and a degree of resistance to alkali which is superior to that of conventional urea resins".

### Marinol K

Charles Page and Co. Ltd., 52 Grosvenor Gardens, London S.W.1, have been appointed sole U.K. importers and general European agents by Marine Oil Refiners of Africa Ltd. for Marinol K drying oil and its derivatives.

### Iridon P.V.C. Sheeting

Literature describing the varieties of high-impact p.v.c. sheeting made by the company is available from Iridon Ltd., 72 Grosvenor Street, London W.1.

### Wax Service Bulletin

The latest wax technical service bulletin available from Bush Beach and Segner Bayley Ltd., Marlow House, Lloyd's Avenue, London E.C.3, includes polish formulations designed for use in the more modern type of container, including p.v.c. satchet, and aluminium tubes. It also deals with removal of 'dry brights' and with Abril waxes.

### Butyl Rubber Processing

Available from Anchor Chemical Co. Ltd., Manchester 11, is detailed information on the subject of dark factice as a processing aid for butyl rubber. Results of laboratory tests are given, and attention is drawn to the main findings of Dr. C. F. Flint.

## *Commercial News*

(*Continued from p. 887*)

statement are orders on hand to the value of £5½ million for work concerning polyolefins plants and offsite facilities, while other orders include engineering and procurement of an acid recovery and acid heating plant for shipment to Russia.

Following the company's construction work on alumina plants in Jamaica, an erection contract was awarded by the same client for a similar plant in British Guiana to produce 180,000 tons/year.

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# NEW PATENTS

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*Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.*

## ACCEPTANCES

### Open to public inspection 29 June

Halogenated hydrocarbons and compositions and methods of production thereof. Miller, W. T. **839 034**

Continuous manufacture of polymeric materials from polyesters and organic di-isocyanates. Imperial Chemical Industries Ltd. **839 183**

Chlorinated phenols. Cocker Chemical Co. Ltd., Watson, G., and Gladden, G. W. **839 972**

Preparation of 1, 2, 3, 4, tetrahydroperfluorobutane and perfluorobutadiene. Haszeldine, R. N., and Iserson, H. **839 756**

Manufacture of cellular polymeric materials. Imperial Chemical Industries Ltd., Gee, E., and Packer, E. A. **839 184**

Manufacture of cellular polymeric materials. Imperial Chemical Industries Ltd. [Divided out of 839 183.] **839 185, 839 187, 839 188**

Manufacture of polymeric materials. Imperial Chemical Industries Ltd., Gee, E., Gudgeon, H., and Stephenson, K. **839 186**

Preparation of cobalt compounds. Rhoanglo Mine Services Ltd. **839 838**

4-Hydroxy phenothiazine and a process for the production thereof. Etablissements Clin-Byla. **839 846**

Manufacture of organo-metal and organo-metalloid compounds. Farbwerke Hoechst AG. **839 370**

Hydrophenanthrene compounds and process for their manufacture. Reichstein, T. **839 746**

Process for the decomposition of linear esters based on aromatic dicarboxylic acids by means of hydrolysis or analogous reactions. Farbwerke Hoechst AG. **839 371**

Process for stabilising high polymer halogen containing ethylene-derivatives and their mixtures and copolymers with other polymerisable organic compounds. Elektrochemisches Kombinat Bitterfeld Veb. **839 852**

Resin compositions and a process for their manufacture. Farbwerke Hoechst AG. **839 460**

Unsaturated thioureido ethers, polymers thereof and process of making them. Rohm & Haas Co. **839 856**

Preparation of vinyl thioethers. Rohm & Haas Co. **839 857**

Polycarbonate resins and their preparation. General Electric Co. **839 858**

Production of gases containing unsaturated hydrocarbons. Eastman Kodak Co. **839 200**

Organopolysiloxanes containing silicon-bonded carboxyalkyl radicals. General Electric Co. **839 374**

Porous polystyrene. Wmb International AB. **839 862**

Steroid compounds and their preparation. Soc. Farmaceutica Italia. **839 376**

Stabilisation of petroleum distillates. Esso Research & Engineering Co. **839 552**

Polymerisation products and their manufacture and use. Ciba Ltd. **839 377**

Production of polymers. Monsanto Chemical Co. [Addition to 804 079.] **839 378**

Thermoplastic synthetic substances. Lonza Electric & Chemical Works Ltd. **839 284**

Polymerisation process and products thereof. Phillips Petroleum Co. **839 007**

Preparation of thioethers. Rohm & Haas Co. **839 561**

Quaternary ammonium compounds and preparation thereof. Rohm & Haas Co. **839 573**

Manufacture of catalysts and carriers therefor. Farbwerke Hoechst AG. **839 882**

Process for drying fibrous material of highly polymerised aromatic polyesters. Farbwerke Hoechst AG. **839 130**

Polymerisation of ethylenically unsaturated compounds. Imperial Chemical Industries Ltd. **839 884; 839 885**

Production of anhydroenneaheptitol. Celanese Corp. of America. **839 259**

Method of treating polytetrafluoroethylene and to polytetrafluoroethylene so treated. Triggs, W. W. (Grinnell Corp.). **839 966**

Photographic silver halide emulsions. Kodak Ltd. **839 579**

Polymerisation. Celanese Corp. of America. **839 887**

Unsaturated dilactones, their manufacture and the preparation of a dibasic acid therefrom. Badische Anilin- & Soda-Fabrik AG. **839 437**

Polymerisation of hydrocarbons. Imperial Chemical Industries Ltd. **839 695**

Polyester resins from dicarboxylic acid anhydrides and monoepoxides. Devoe & Raynolds Co. Inc. **839 773**

Steroids and the synthesis thereof. Olin Mathieson Chemical Corp. **839 698**

Process for the electrical heating of titanium tetrachloride vapour. Du Pont de Nemours & Co. E. I. **839 022**

Polymerisation of olefins. Goodrich-Gulf Chemicals Inc. **839 398**

Cyanine and merocyanine dyes. Ilford Ltd. **839 020**

Process for purifying solid ethylene polymers. Stamicarbon N.V. **839 489**

Production of methylenedioxyphenyl derivatives. Food Machinery & Chemical Corp. **839 494**

Compositions containing pyridinethianes. Olin Mathieson Chemical Corp. **839 495**

Extraction of alkaloids. Whiffen & Sons Ltd. **839 403**

Polyesters. Imperial Chemical Industries Ltd. **839 404**

Thiophosphoric acide esters. Farbenfabriken Bayer AG. **839 897**

Detergent compositions. British Nylon Spinners Ltd. **839 407**

Preparation of organic dicarbamates. Berkeley Chemical Corp. **839 408**

Maleimide polymers and their preparation. Union Carbide Corp. **839 410**

Preparation of 4-*N*-butyl-pyrazolidine-3:5-dione and 1-alkyl substituents thereof. Commissionaria Farmaceutica Milanese C.F.M. S.r.l. **839 057**

Process for preparing a pyridoxine. Pfizer & Co. Inc. **839 583**

Process for solidifying epoxy or phenolaldehyde resins. Bataafsche Petroleum Maatschappij N.V., DE. **839 584**

Catalysed halogenation of rubbery copolymers. Esso Research & Engineering Co. **839 270**

Phosphate compound process for preparing same and insecticidal compositions containing same. Wisconsin Alumini Research Foundation. **839 725**

Reaction products of bis (2:3-epoxycyclopentyl) ether with polycarboxylic acid anhydrides. Union Carbide Corp. **839 238**

Reaction products of bis (2:3-epoxycyclopentyl) ether with a polycarboxylic acid anhydride and a polyol. Union Carbide Corp. **839 239**

Reaction products of bis (2:3-epoxycyclopentyl) ether with a polycarboxylic acid. Union Carbide Corp. **839 240**

Reaction products of bis (2:3-epoxycyclopentyl) ether with a polyfunctional amino compound. Union Carbide Corp. **839 906**

Production of olefin polymers. Goodrich-Gulf Chemicals Inc. **839 060**

Process for the nuclear alkylation of aromatic compounds. Biller, E. **839 501**

Method of preparing fatty acid partial esters of a mixture of glycocides of sugars. Udic S.A. **839 728**

Derivatives of etiocholane and the preparation thereof. Laboratoires Francais de Chimiotherapie. **839 911**

Polymethylerle bis-quinolinium and iso-quinolinium salts. Allen & Hanburys Ltd. **839 505**

Arylides. Geigy AG., J. R. **839 506**

Manufacture of aromatic disulphonic acids. Imperial Chemical Industries Ltd. **839 663**

Carbon black. Columbian Carbon Co. **839 918**

Production of conjugated diolefins. British Hydrocarbon Chemicals Ltd. [Addition to 826 546.] **839 309**

Carbon black beading process. Columbian Carbon Co. **839 919**

N-(alpha-hydroxy-beta-trihalogen-ethyl)- pyrrolidones and the process for the production thereof. Badische Anilin- & Soda-Fabrik AG. **839 593**

2-(Hydroxyalkyl)- bicyclo [2, 2, 1]-heptane and -heptane derivatives and their preparation. Asta-Werke Aktiengesellschaft Chemishe Fabrik. **839 271**

Methanisation catalysts. Esso Research & Engineering Co. **839 664**

Heterogeneous catalytic processes. Institut Francais du Petrole des Carburants et Lubrifiants. **839 066**

Production of acetyl-substituted pyridines. Distillers Co. Ltd. **839 522**

Compounds of O, O¹-dialkyphosphoric or -thiophosphoric acids and a process for their production. Badische Anilin- & Soda-Fabrik AG. **839 924**

Process for the preparation of solutions and powders of polymethylene terephthalates, as well as the artificially-formed products manufactured therefrom. Onderzoekingsinstituut Research N.V. **839 791**

Chrominum-containing monoazo dyestuffs. Farbenfabriken Bayer AG. **839 931**

Substituted thioureas and their use as pesticidal agents. Yorkshire Tar Distillers Ltd. **839 797**

Process for purifying 1, 1, 1-trimethylol alkanes having at least 6 carbon atoms. Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler. **839 934**

Disazo dyestuffs and their metal complex compounds. Sandoz Ltd. **839 673**

Cells for the electrolysis of hydrochloric acid or aqueous chloride solutions. Badische Anilin- & Soda-Fabrik AG. **839 275**

Polyvinyl chloride film. Du Pont de Nemours & Co., E. I. **839 070**

Method of producing esters of isocyanic acid. Sowa, F. J. **839 279**

Manufacture of polymeric materials from polyesters and organic polyisocyanates. Imperial Chemical Industries Ltd. [Divided out of 839 183.] **839 189**

Substituted toluidides and compositions containing them. Astra Apotekarnes Kemiska Fabriker A.B. **839 943**

Recovery of finely divided solids. Esso Research & Engineering Co. **839 896**

Substituted dibenzo-cycloheptadienes and the preparation thereof. Uclaf. **839 164**

Tantalum-columbium-chromium alloy. Sierra Metal Corp. **839 944**

Deodorising of gases. Kurmeier, H. H. **839 609**

Process for the production of acrolein. Farbenfabriken Bayer AG. **839 808**

Acid hydrazides and a process for the manufacture of same. Hoffman-La Roche & Co. AG., F. **839 610**

Catalytic conversion of hydrocarbons. California Research Corp. **839 813**

Method for the preparation of ortho-vinyltoluene. Dow Chemical Co. **839 612**

Acetylenically unsaturated ethanolamines and process for their preparation. Miles Laboratories Inc. **839 289**

Thermal decomposition of chemical compounds. Fraser, R. P. [Addition to 827 719.] **839 949**

Divulent metal catalysts and their uses in the polymerisation of epoxides. Union Carbide Corp. **839 171**

Carbon black. Continental Carbon Co. **839 816**

Process for obtaining hydrocyanic acid. Deutsche Gold- und Silberscheideanstalt vorm. Roessler. **839 614**

Organic lead compounds. National Aluminate Corp. **839 172**

Process for working up dilute aqueous hydrazine solutions. Farbenfabriken Bayer AG. **839 414**

Process for the production of hydrazonium salts. Farbenfabriken Bayer AG. **839 819**

Process for separating hydrazine hydrate from aqueous solutions containing acetone and hydrazine hydrate. Farbenfabriken Bayer AG. **839 820**

Process for concentrating aqueous hydrazine solutions containing acetone. Farbenfabriken Bayer AG. **839 415**

Process for the manufacture of N-cycloalkylsulfamic acids and alkali or alkaline earth metal salts thereof. Ciba Ltd. **839 416**

Process for the production of benzthiazole-2-dicycloalkyl-sulphenamides. Farbenfabriken Bayer AG. **839 417**

Production of copolymers. Badische Anilin- & Soda-Fabrik AG. **839 825**

Acetylene generation. Shawinigan Chemicals Ltd **839 392**

Process for preparing substituted diphenylamines. United States Rubber Co. **839 420**

Process for the preparation of substantially oil-free petroleum wax compositions. Bataafsche Petroleum Maatschappij N.V., DE. **839 619**

Carbazinic acid derivative. Olin Mathieson Chemical Corp. **839 734**

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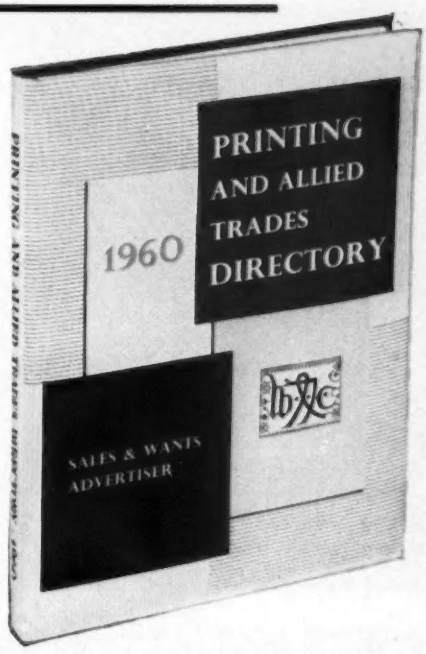
***Published by: The Printers Lithographers Bookbinders & Stationers SALES & WANTS ADVERTISER***

The Printers' Section of the Directory lists nearly 9,000 firms throughout the British Isles, giving wherever possible the classes of work undertaken. Names are arranged both alphabetically and geographically under the towns in which the firms are located, thus providing the print buyer with a selection of firms suitable for his purpose in the area he requires.

Other sections include: Names and addresses of some 1,200 leading suppliers to the printing and allied industries, and a Classified Buyers Guide listing their products and services under 750 headings. Trade Names and Marks used by manufacturers and suppliers. A list of Trade Organisations connected with the printing trades.

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